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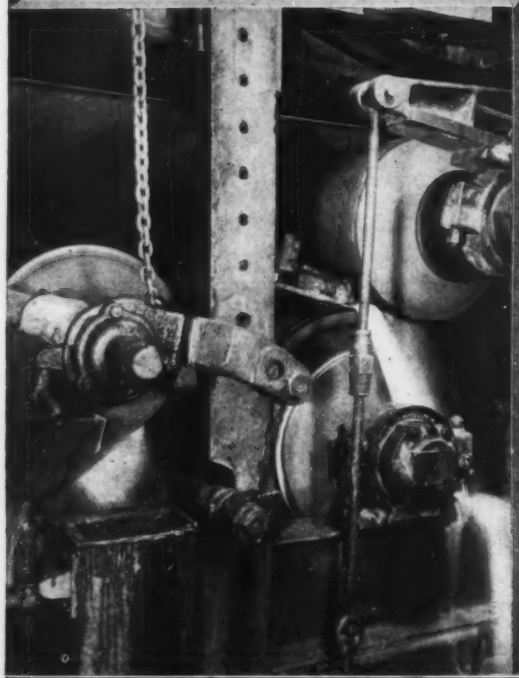

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THE INTERNATIONAL WEEKLY OF THE PAPER AND PULP INDUSTRY AND THE PIONEER PUBLICATION IN ITS FIELD

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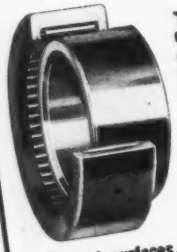

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Vol. CVII, No. 22 Thursday, December 1, 1938
PAPER
Established Sept. 21, 1918
Consolidated Feb. 19, 1925
with PAPER TRADE JOURNAL.

Clifton Paperboard Co. Installs 142-Inch Bagley & Sewall Cylinder Machine

The new 250 ton machine at the plant of the Clifton Paperboard Company, Inc., Clifton, N. J., is now in operation. This modern 142-inch, eight cylinder board machine was designed and built by the Bagley & Sewall Company, Watertown, N. Y., and incorporates a considerable number of interesting features for producing boards of a wide range of weights.

Anthony Desiderio, president of the Clifton Paperboard Company, Inc., and William A. White, superintendent of the mill, have been actively in charge of this new project since its inception over a year ago. This is the seventh new machine that Mr. White has started operating in the various mills where he has been superintendent.

New Buildings Constructed by Austin Co.

The new building housing the new machine and stock preparation equipment, together with the boiler house, was constructed by the Austin Company, Cleveland, Ohio. The machine room is 350 feet long by 46 feet wide, and has a height under the traveling crane of 36 feet. The overall length of the machine is 307 feet, 6 inches.

The construction of the new buildings is all brick with a considerable amount of glass, all of which provides for most satisfactory operating conditions. The roof is made of pre-concrete slab manufactured by the Porete Company, North Arlington, N. J.

The stock preparation equipment has been installed to handle three grades of paperstock—filler, top liner and back liner.

Dilts Breaker Beaters

The breaker beaters, which are the initial point of operation, were furnished by the Dilts Machine Company of Fulton, N. Y. The filter breaker is located in the breaker beater building of the old mill and is totally submerged beneath the floor. It has a capacity of 150 tons in 24 hours and will handle the stock between 4 per cent and 5 per cent consistency. The beater tub sides are cast iron: The 74 inch diameter by 72 inch face roll is the bandless type having twenty-two, 1x10 inch fly bars. The beater has a perforated back-fall and extraction pit. The stock is discharged from the extraction pit to a steel regulating box with an adjustable weir control. The beater is 50 feet long, 18 feet wide and 7 feet 10 inches deep and has a hollow mid-feather. It is driven with a 150 h.p. General Electric motor by means of "V" belts turning the roll at a speed of 96 r.p.m. This beater is equipped with a Dilts rag catcher and also a Shartle Murphy junk remover, built by the Shartle Brothers Machine Company of Middletown, Ohio. This will enable the operator to keep the beater clean during periods of operation and thus the capacity is not reduced.

The stock is taken from the steel regulating box by an 8 inch double suction Hayton Miami pump, built by Shartle Bros. Machine Company. The pump has a capacity of 1400 g.p.m. of 4½ per cent stock at 1175 r.p.m. It is of the open impeller type and is direct connected to a 30 h.p. General Electric motor. This pump discharges the settling trough and is only run intermittently as the demands necessitate.

The settling trough was built by Dilts Machine Company. It is 65 feet long, 9 feet wide, mid-feather type round on one end. The material is Armco, ¼ inch steel plate and made up in sections and arc welded at the joints.

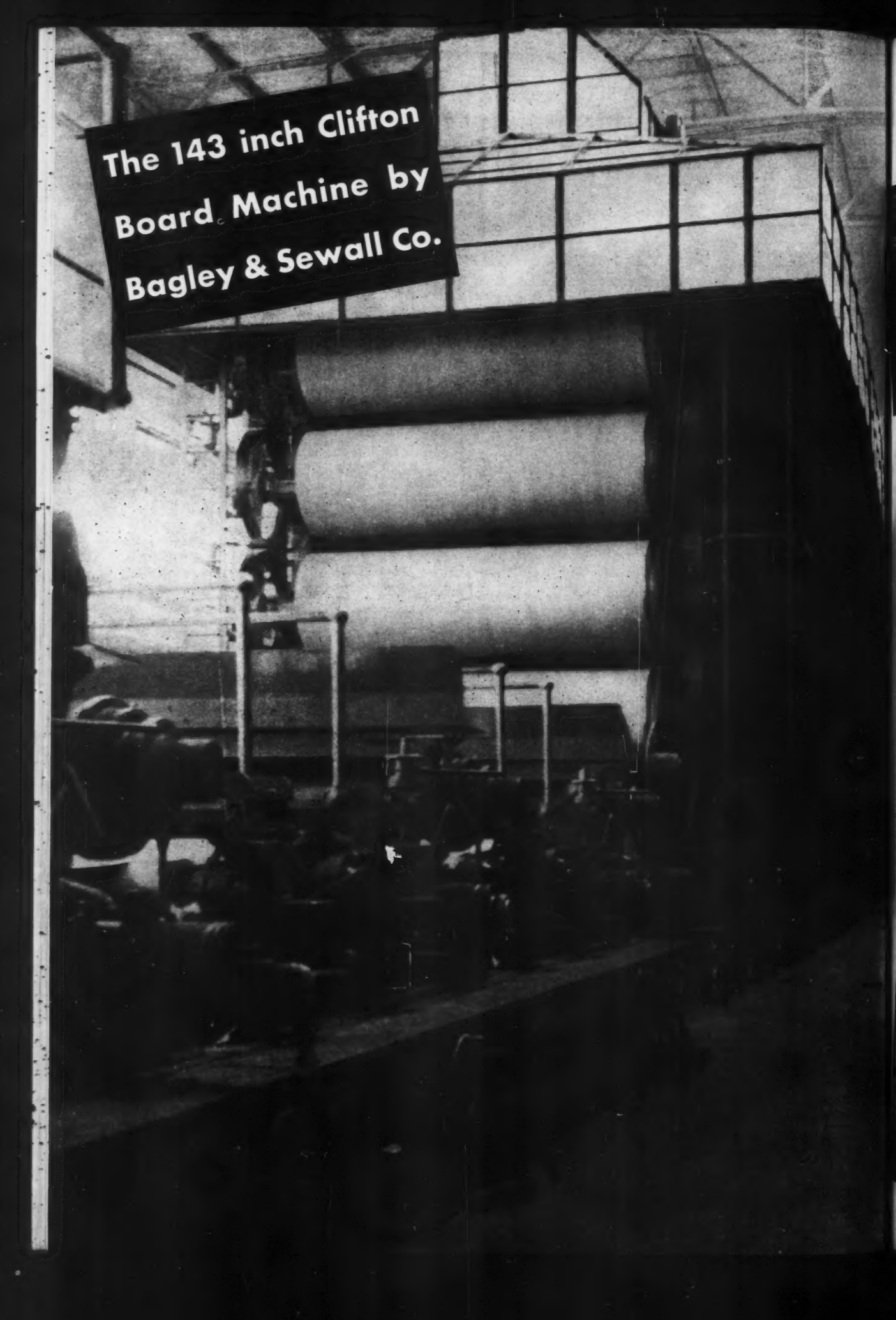
Cowles Classifiners

The diluted stock from the settling trough is taken by gravity to two, Cowles classifiners which are located directly below the settling trough and on top of the breaker beater stock chest. The Cowles classifiners are built by the Dilts Machine Company and are driven by 75 h.p., General Electric motors with "V" belts to a flat driven pulley on the classifiners at the rate of 375 r.p.m.

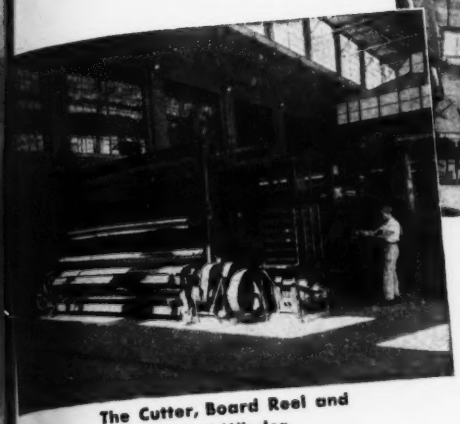
The stock passes through the classifiners, where quantities of foreign matter are separated from the good stock, and the good stock is returned to the settling trough while the rejects are discharged to two Cowles detrashers, which are built by the Dilts Machine Company, and are mounted on top of the settling trough. The detrashers separate the remainder of the good stock from the foreign matter and deposit it back into the settling trough.

Shartle Thickeners

The diluted stock is then taken from the settling trough through two 16 inch pipes to the two Shartle,


The 143 inch Clifton
Board Machine by
Bagley & Sewall Co.

View of Third Press and Vertical Stack Dryers



The Cutter, Board Reel and Board Winder

Front View of Cylinder Vats, Auxiliary Presses and Main Presses

Modern Bagley and Sewall Eight Cylinder Board Machine in Production at Clifton Paper Board Company, Inc. - -

• The eight cylinder, 143 inch board machine installed in the new mill of Clifton Paper Board Company, Inc., is one of the largest machines of its type operating in this country.

The machine is equipped with eight cylinders, 48 inches, diameter and vats of the Controlled-Flow type, built by Bagley and Sewall Company. These vats are of a comparatively new design and a most interesting type, which make possible the production of both light weight liner sheets and heavier weight filler sheets. It is largely because of the type of vats installed that the machine is able to produce a wider range of grades and weights than is usually possible in board mill operation.

Following the cylinder molds are a series of primary presses combining the use of both suction and plain presses, these being used alternately. The first main press of the suction type is followed by two regular presses of the conventional design.

The dryer section of the machine is equipped with 128 dryers, 42 inches diameter, all arranged in vertical stacks.

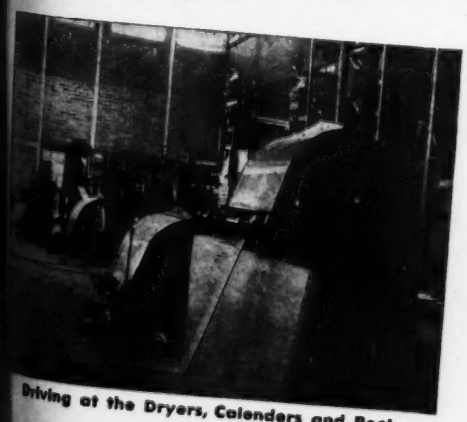
Following the dryer section there are two stacks of calenders, cutter, board reel and board winder.

The machine parts are driven by the Bagley and Sewall enclosed spiral bevel gear floor cone drives of the compound type.

The machine is driven by a Moore steam turbine, with variable speed reducer and direct connected to the line shafting in the basement.

• • •

The Bagley & Sewall Company - Watertown, New York, U.S.A.



Driving at the Dryers, Calenders and Reel

BAGLEY B&S SEWALL

Enclosed Spiral Bevel Gear Drives

36 inch diameter by 120 inch face thickeners which are located directly under the settling trough and on top of the breaker beater stock chest. These Shartle thickeners have cast iron ends and Armco steel side plates. The cylinders have a No. 14 mesh wire covering and the stock is picked up with a rubber couch roll. The thickeners are driven by a U. S., 7½ h.p. motor by means of a reduction gear.

The stock from the thickeners is deposited in the chest and the white water is taken to a white water chest which is built as part of the main chest. The white water is then pumped back to the settling trough by means of an 8 inch Gould, double suction pump, for dilution purposes. This pump will deliver 1800 g.p.m. and is driven by a 25 h.p., General Electric motor.

The breaker beater stock chest was designed and built for the operation of the Hayton Miami No. 20 agitator. It is a reinforced concrete chest 54 feet long, 11 feet 4 inches wide, and 9 feet deep. It is a mid-feather type chest with pitched channels to allow the stock to circulate freely. It has a capacity of 10,000 pounds, 4 per cent stock. The chest was built by the Austin Company, engineers and builders.

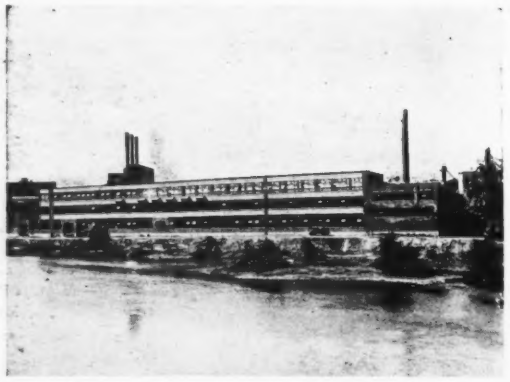
Hayton Miami Agitator

The No. 20 Hayton Miami agitator, built by the Shartle Bros. Machine Company, has a large suction inlet on one side of the mid-feather at the bottom and discharges the stock through a 22 inch pipe to the top of the chest where it is deflected by a back-board and diverted into the other side of the mid-feather, thus the stock must make a complete circuit before again returning to the suction inlet. The No. 20 agitator will circulate 6000 g.p.m. of 4 per cent paper stock and is direct connected to a 40 h.p., General Electric motor which will run at a speed of 900 r.p.m.

Directly connected to the No. 20 agitator is a Shartle, Miami 10 inch double suction stock pump. The pump will be run intermittently and discharges to the grinding beaters, on the main beater room floor, through 14 inch header pipe with a 12 inch branch to each beater. The pump is of the open impeller type and has a capacity of 3000 g.p.m. of 4 per cent consistency stock. It will be able to charge a 2000 lb. beater in 2 to 2½ minutes. It is driven by a 75 h.p., General Electric motor direct connected and run at a speed of 1180 r.p.m.

The grinding beaters were at one time in use on the old machine and were taken off the line several years ago when new equipment was added. These beaters are MidWest and Downingtown by make and have capacities of 1800 lbs. and 1500 lbs. of stock respectively. Provisions have been made for the addition of several new beaters and hydrafiners in the near future.

WET END OF 142-INCH BAGLEY & SEWALL MACHINE.

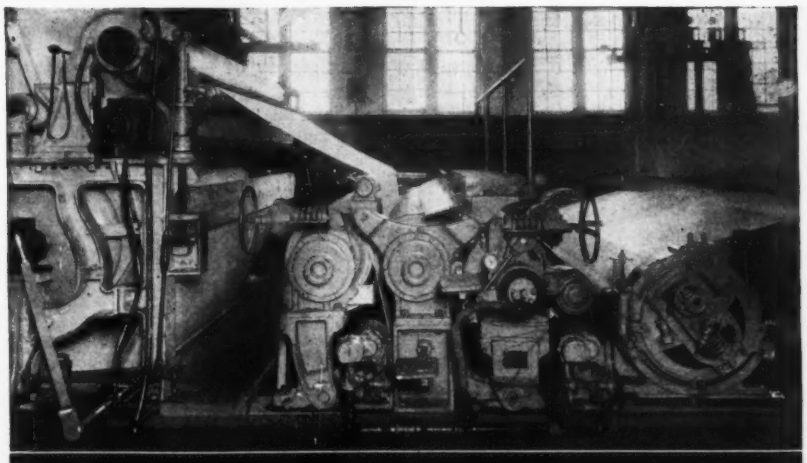


GENERAL VIEW, CLIFTON PAPER BOARD CO.

The liner breaker, which is located on the third floor of the beater room building, has a capacity of 60 tons dry paper in 24 hours, and will prepare the stock at a consistency between 4 per cent and 5 per cent. The beater sides are cast iron and the roll is 64 inches in diameter by 48 inch face, bandless type construction having twenty, 1x10 inch fly bars. The beater has a perforated back-fall and extraction pit. The stock is discharged from the extraction pit to a steel regulating box with an adjustable weir control. The beater is 40 feet long, 10 feet 4 inches wide with a narrow back channel and hollow mid-feather. The beater is driven by a 75 h.p., General Electric motor by means of "V" belts onto a flat driven pulley which is driven at a speed of 112 r.p.m. This beater dumps by gravity through the steel regulating box to the grinding beaters, which are located on the floor below.

Kalamazoo Tank and Silo Chest

The grinding beaters dump by gravity to the three beater dump chests, which are located on the basement floor of the new beater building. These chests are made of glazed tile and were built by the Kalamazoo Tank and Silo Company of Kalamazoo, Mich. The filler stock chest is round on one end and square on the other, having a tile mid-feather. Its dimensions are 24 feet long, 12 feet wide and 11 feet 8 inches high overall. The stock is agitated in this chest and also pumped to the Jordan regulating head box by means of the new Hayton Miami No. 14-6, combination agitator pump. This unit is built by the Shartle Bros. Machine Company, Middletown, Ohio. The agitator has its suction outlet on one side of the mid-feather of the chest and at the bottom. The inlet is on the opposite side of the mid-feather and near the top of the chest. 16-inch pipe is used from the agitator back to the chest, making it easy for the stock to circulate. The agitator has an impact impeller of the screw type. It takes the stock from the chest in a measured volume and returns it to the chest in sufficient volume to give uniform agitation. The inlet to the centrifugal pump is connected direct to the Hayton agitator and maintains a constant discharge head to the Jordan regulating head box regardless



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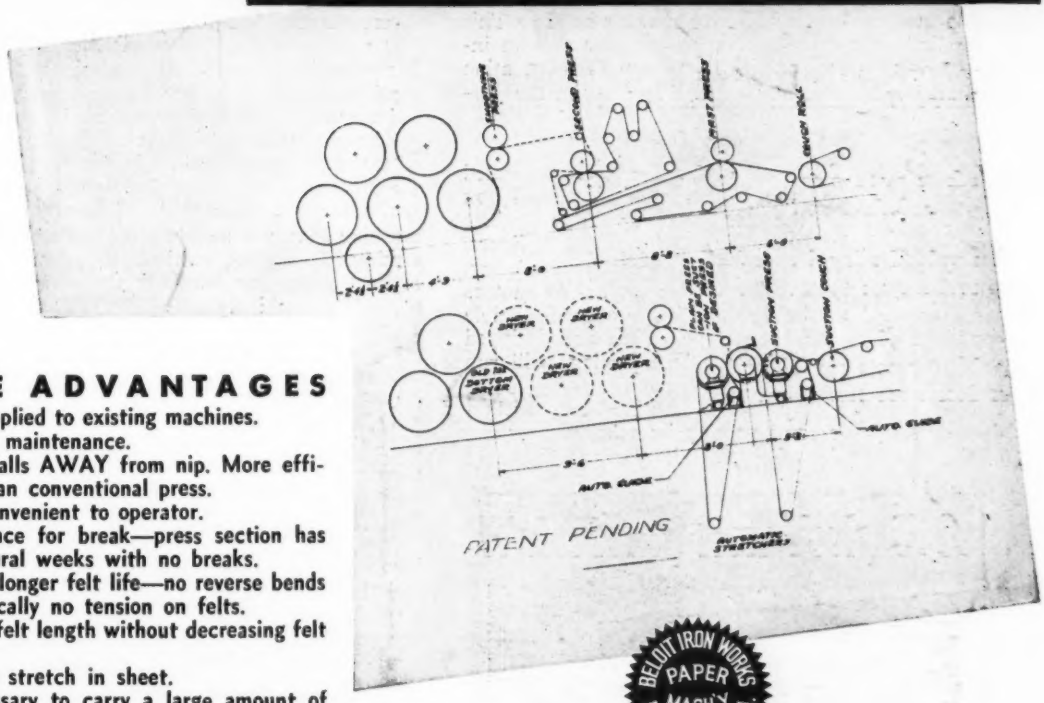

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of the amount of stock in the chest. This pump is the open impeller type with adjustable plates on each side of the impeller. The agitator has a capacity of 2500 g.p.m. of 4 per cent stock. The pump has a capacity of 100 g.p.m., 4 per cent stock. The two units are mounted on the same base and are driven by a 40 h.p., General Electric motor at 1200 r.p.m.

The top and back liner chests are 24 feet long, 12 feet wide and 11 feet 8 inches high overall. They are built of glazed tile and are square on both ends, having a pitched bottom and rounded corners. These two chests have the paddle type, horizontal agitators built by the Shartle Bros. Machine Company. The agitators are driven by 7½ h.p. Westinghouse gear motors at the speed of 5.8 r.p.m.

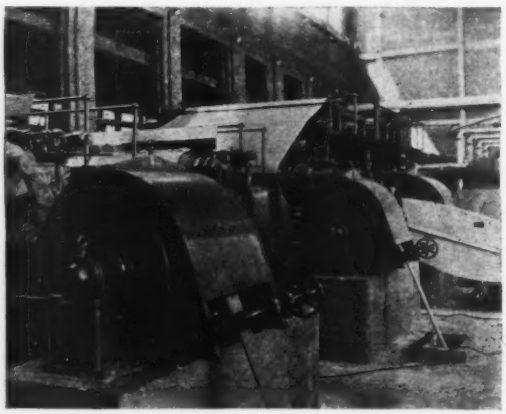
Downingtown Plunger Pump

The stock from the back liner chest is pumped to the Jordan regulating head box by a Downingtown, 10x16 inch, triplex plunger pump driven by a 15 h.p., General Electric motor. The stock from the top liner is pumped to the Jordan regulating head box by a Beloit, 10x20 inch, triplex, plunger pump driven by a 20 h.p., General Electric motor.

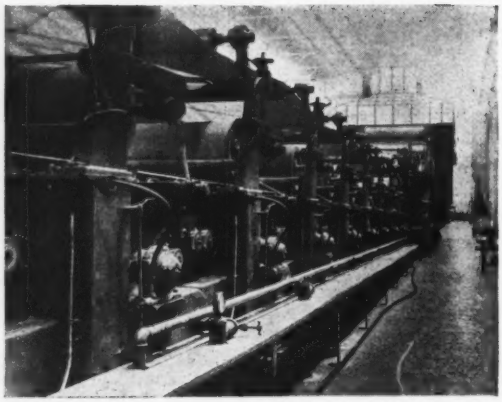
The Jordan regulating head box, designed and built by the Clifton Paperboard Company, is a three-way box built to handle filler, back liner and top liner. It has adjustable overflow gates which return the excess stock back to the dump chest. It also has adjustable brass slide gates, 6 inches each, which regulate the amount of stock to the Jordans, which are located on the floor directly beneath the box. This box eliminates the use of a header pipe and an intricate valve arrangement. It also localizes operation and allows extreme and rapid flexibility on the Jordans.

Shartle Miami Jordans

The five No. 2 Shartle Miami Jordans are located on the floor below the Jordan regulating head box and directly above the machine chests. The Jordans have a capacity of 30 to 40 tons of paper in 24 hours. They are driven by 150 h.p. synchronous motors, built by Electric Machinery Company. The motors are connected to the Jordans by means of flexible couplings of the telescope type. They are equipped with micrometer adjustment. The Jordans will run at a speed of 450 r.p.m. The discharge piping is arranged in such a way that the Jordans can run tandem or single or can be easily interchanged on any of the three grades of stock. The Jordans discharge into the filler, back liner and top liner machine chests.



WET END SHOWING DRIVES AND BLANKET IN PLACE.



GENERAL VIEW OF WET END WITH BLANKET IN PLACE.

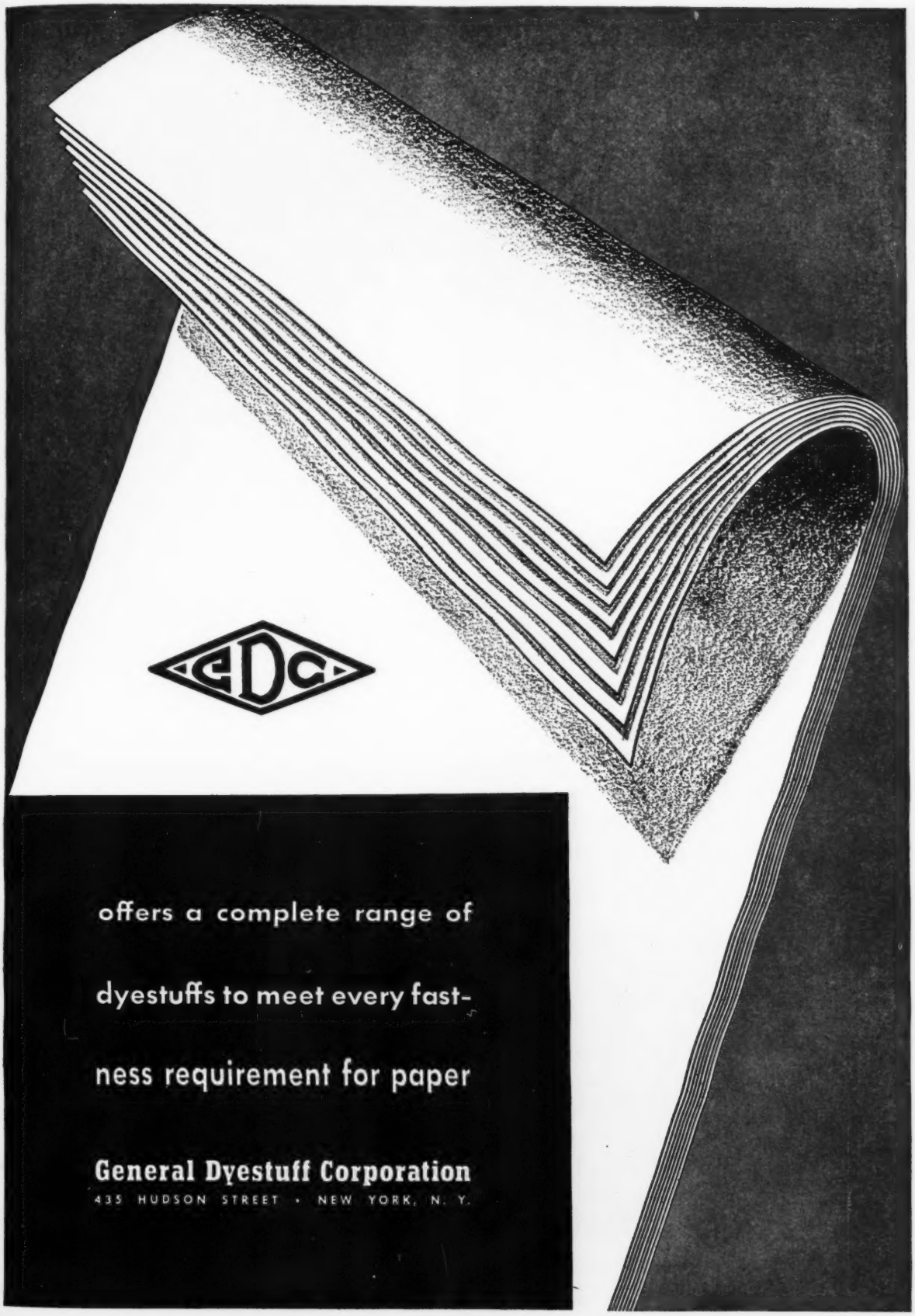
The machine chests are Kalamazoo glazed tile and are the same size and design as the filler chest on the beater room side. The filler chest is equipped with No. 14-6 Hayton Miami, combination agitator pump identical to the one pumping to the Jordan regulating head box. The back and top liner are equipped with No. 14-4 Hayton Miami combination agitator units which are the same as the No. 14-6 units but smaller in size. They are driven by 30 h.p., General Electric direct connected motors and will have a capacity of 400 g.p.m. of 4 per cent consistency stock. The stock is discharged from these three units to the regulating stuff box which is located in the main machine room building over the Bird screens.

The new machine is one of the largest machines of this type operating in this country and represents the most modern design for the type of production to be made in this mill. Generally speaking, the machine is very complete from the standpoint of operating convenience and is equipped with many automatic devices for handling the sheet at all points along the machine.

Control Flow Vats

The wet end of the machine consists of eight control flow vats designed and built by the Bagley & Sewall Company. The type of vats installed is such that a maximum range of weights can be made on this machine. The control flow vats are used on both liner and filler, the adjustments provided in the design of the vats permit the forming of light weight liner sheets, as well as heavy weight filler. The cylinder molds are 48 inch diameter by 143 inch face and are of a special rigid type, manufactured by the builder of the machine. All of the cylinder molds are carried on Timken bearings.

Each vat is equipped with two pumps, one being used as a circulating pump and a smaller pump is used only for handling the required amount of white water from inside the mold to the screens and regulating boxes. With this arrangement, the circulating pump is a low head, flat curve pump, requiring minimum horse power and the white water pump is a small, high head pump requiring little horse power as it handles only the required white water, as stated above. Large diameter piping is used between the mixing boxes and the vats. The stock piping leading to the vat is 20 inches in diameter and these large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pipes in conjunction with the low head, flat curve circulating pump provide for the required volume with the minimum velocity so that the tendency for foam in the vat is practically eliminated.

Each vat is equipped with 22 inch rubber covered couch roll, each 148 inch face, with rubber coverings having been furnished by the Manhattan Rubber Manufacturing Company. The couch rolls are of the internal bearing type, carried on trunnions.

Bird Screens

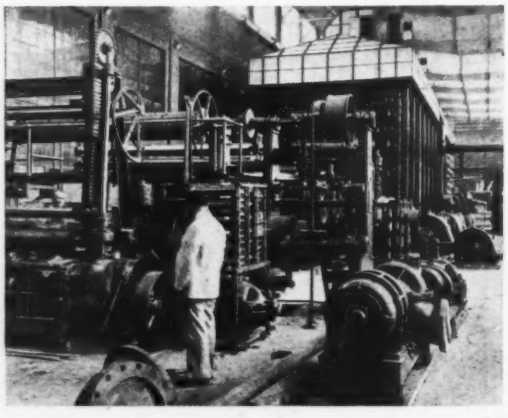
There are eight No. 3 A Bird screens and one 16 plate flat tailing screen furnished for the wet end of machine. These screens were designed by the Bird Machine Company especially for use in operation with board machines.

The design of the wet end is such that the wet pickup felt runs in a forward direction toward the primary presses and a lower felt contacts the pickup felt as it leaves the last vat. With this arrangement, the top and bottom felts operate through the primary presses and the top felt may or may not lead to the first main press, as desired. The top pickup felt is 212 feet long and the bottom felt is 76 feet long, both equipped with Nash automatic guides.

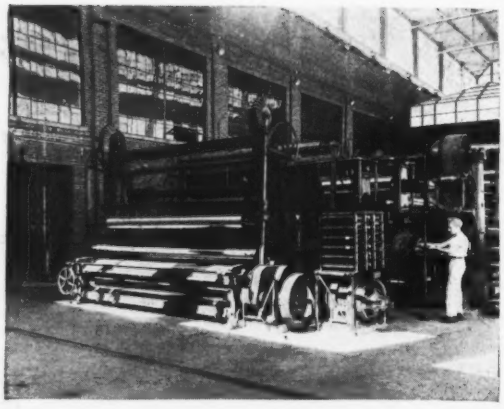
The primary presses consist of alternate regular presses and suction presses. The first primary press is a suction press consisting of a 24 inch lower rubber covered suction roll, and a 16 inch top rubber covered roll. The second primary is a regular press consisting of a bronze 18 inch lower roll and a top 16 inch rubber covered roll. The third primary press has a 24 inch rubber covered Beloit suction lower roll and an 18 inch rubber covered top roll. The fourth primary press is a regular press consisting of an 18 inch bronze lower roll and an 18 inch rubber covered top roll. All primary press rolls are carried on SKF bearings. The framework provided for the primary presses is arranged to carry two stretches each for the top and bottom wet felts and is equipped with nicely arranged footwalks and ladder for use when changing felts. The suction primary presses are equipped with H-7 Nash pumps. The first, third and fourth primary presses are electrically driven by 15 h.p. Westinghouse gear motors, all driven by a motor generator set driven from a rear extension on indriving shaft.

The Main Press Section

The main press section is composed of one suction



DRY END SHOWING MOTORS AND CONTROLS.



DRY END SHOWING CALENDERS.

first press, followed by two straightaway regular presses. The first press consists of a 26 inch Beloit rubber covered suction lower roll with a 24 inch Stonite top roll, covered by Stowe & Woodward. The second press has a 24 inch lower rubber covered roll with a 24 inch top Stonite roll. The third press has a 24 inch lower rubber covered roll with a 24 inch Rubrock top roll covered by the Manhattan Rubber Manufacturing Company. All press rolls are carried on SKF anti-friction bearings, except the second and third lower rolls, which are carried on bronze lined, ring oiling, self-aligning bearings. All top press rolls are equipped with vibrating doctors of the Lodding type.

The felt rolls for the press section are partly brass cased and partly rubber covered, and are all carried on SKF bearings. There are two 14 inch suction felt rolls manufactured by the Downingtown Manufacturing Company.

Suction equipment for the press section consists of one H-7 Nash pump for the first press lower roll and two K-5 Nash pumps for the suction felt rolls. Four Vickery felt conditioners on the machine are coupled to L-4 Nash pumps. All suction pumps are motor driven.

All shower pipes for the wet end and press section were supplied by the Bird Machine Company.

The Drier Section

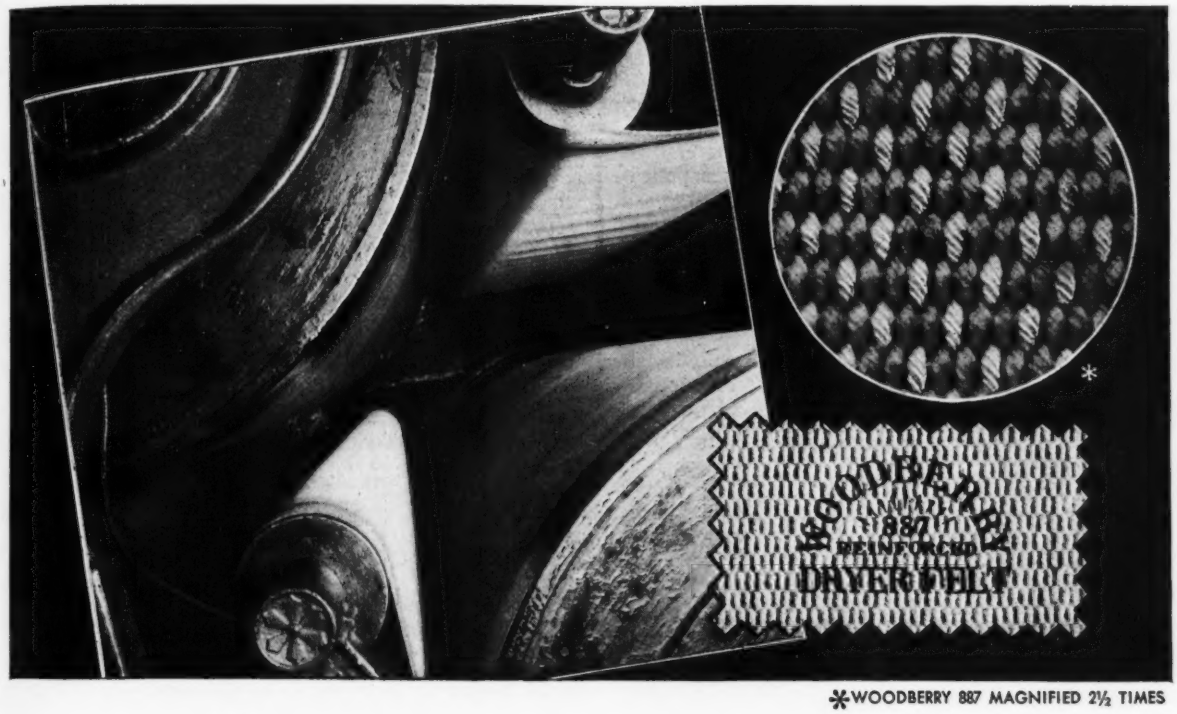
The drier section consists of 128 driers, 42 inch diameter by 138 inch face, and are carried on vertical framework designed and built by the Bagley & Sewall Company. The vertical frames are of wide, deep section, box type and are carried below the machine room floor level to rigid foundation in the basement. The hollow section frames are arranged to operate as distributing ducts for the Ross system, by which means hot air is introduced between driers. The total overall height of the vertical framework is approximately 33 feet.

Each vertical section is arranged to carry 18 driers, arranged four high above the floor with two driers located on the cross member between vertical frame. The driers are mounted so that there is a minimum clearance of 5 feet from the lower drier to the machine room floor level.

Located immediately after the last press are two driers preceding those located on the vertical frame. These driers are for the purpose of cutting a tail prior to passing the sheet into the automatic paper

Set up a New Low Dryer Felt Cost Equation with WOODBERRY 887 Reinforced Dryer Felts . . .

SAVINGS OF FROM 22% TO 41% REPORTED FROM FIRST FELTS IN USE



*WOODBERRY 887 MAGNIFIED 2½ TIMES

WOODBERRY 887, the new Mt. Vernon-Woodberry Mills patented reinforced dryer felts are making history in the paper industry. New lows in dryer felt costs are being reported every week by those who have adopted them. WOODBERRY 887 is a triplex weave cotton felt reinforced only at intervals on the face by asbestos yarns which give these unusual felts a substantially longer life.

Like all Mt. Vernon-Woodberry Mills dryer felts, WOODBERRY 887's are precision fabrics woven on the finest modern looms to rigid standards of tolerance. They are fast drying with shrinkage and stretch reduced to a minimum.

Specify WOODBERRY 887 and watch your dryer felt costs go down.

MT. VERNON-WOODBERRY MILLS, INC.

TURNER HALSEY COMPANY

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carrier installed on the vertical driers. A suitable pit is arranged below these two receiving driers so that broke may be collected without interference to the operators.

All driers are mounted on special self-aligning, ring oiling bearings and are driven by 5 inch face machine cut gears having Maag tooth formation.

Steam System for Driers

The steam system for the driers was supplied by the MidWest Fulton Company and steam is delivered to the drier section through 12 inch and 8 inch horizontal headers, 4 inch and 8 inch vertical headers, and 2 inch and 1 inch connections to the individual driers. Paramount steam joints are fitted to each drier. Bowser continuous oiling system has been installed and all bearings in the drier section are lubricated by this system.

Over the drier section is a Ross hood furnished and installed by the J. O. Ross Engineering Company.

Approximately 20 of the driers at the wet end of the section are fitted with Vickery doctors supplied by the Bird Machine Company.

The calender section consists of two stacks, the first containing six rolls and the second having eight rolls, each stack is fitted with hydraulic lifting mechanism which operates from 3 h.p. motors and necessary pumps. The calender rolls were supplied by the Farrel-Birmingham Company and are equipped with Vickery doctors. Each stack is also fitted with a Bowser continuous lubricating system. The lower rolls in each stack are 26 inch diameter, with 12 inch intermediate rolls and each stack has a 16 inch top roll.

Cameron Slitter

Following the calender stacks is a Cameron slitter, from which the sheet goes to a duplex cutter built by the Black-Clawson Company. This cutter is of their latest heavy type design and arranged to operate at maximum speed of the paper machine.

Following the cutter is the vertical two drum Jumbo reel designed by the Bagley & Sewall Company and all arranged to reel 66 inch rolls maximum. A special paper carrying device has been installed to take the sheet from the Cameron slitter over the cutter and automatically pass the sheet to the reel. This is a very convenient arrangement as there are 30 feet between the slitter and the reel. The reel drums are each 18 inches in diameter, made of 12 inch steel pipe with special type wood-lagging to minimize danger of accidents to operators. A ladder and upper footwalk with necessary handrails are supplied for ease of operation in passing the sheet from one drum to the other.

AISLE ALONG BIRD SCREENS SHOWING DUMP SHAFT.

Cameron Winder

Following the reel is a special board type Cameron winder, equipped with drums 14 inch diameter by 142 inch face. The winder is designed to wind 60 inch diameter finished rolls.

The total overall length of the machine from centerline of first cylinder mold to centerline of winder drums is 307 feet 6 inches.

The driving arrangement for the machine consists of compound type, spiral bevel gear, totally enclosed units, all equipped with twin disc clutches. Each unit is equipped with a force feed lubricating pump to assure distribution of oil to all necessary points, regardless of the speed at which the drives may operate. Drives are completely equipped with anti-friction bearings. The indriving shafts are fitted with fast flexible couplings leading to each driven point of the machine.

The line shaft is located in the basement and carried on anti-friction pillow blocks. The prime mover for the line shaft is a Moore steam turbine. Turbine capacity is 500 b.h.p. at 450 to 4527 r.p.m.

The cylinder face wires were supplied by the Wilson Wire Works, Inc., Kearny, N. J. The face wires for the molds were installed at the mill.

Each cylinder vat is equipped with two pumps. The 14-inch circulating pumps were supplied by Economy Pumping Machinery Company, Chicago, Ill., each individually driven by Louis-Allis direct connected motors 15 h.p. each. The 4-inch white water pumps for delivery of necessary white water to screens were supplied by Ingersoll-Rand Company, and are also driven by direct connected General Electric motors 7½ h.p. each.

Nash Vacuum Pumps

The vacuum pumps, of which there is a total of seven, were supplied by the Nash Engineering Company, South Norwalk, Conn.

On the wet end of the machine is a Westinghouse motor generator drive driven from the first press indrive shaft, and current is supplied by this unit to individual motors driving the auxiliary presses.

The cylinder section and the press section are equipped with Bird felt conditioners and Downingtown suction felt rolls for keeping the felts in continuous operating condition.

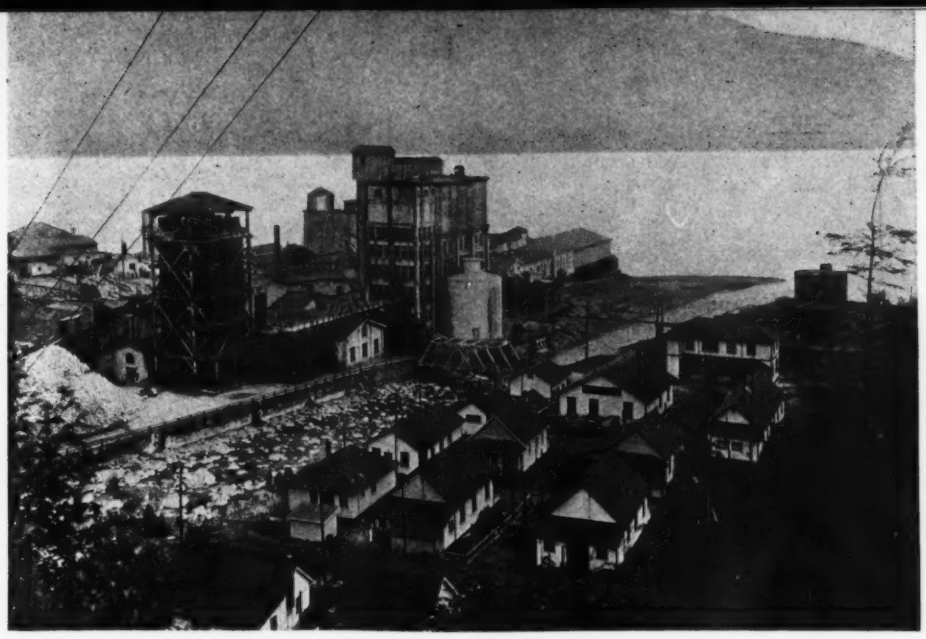
The driers are equipped with Vickery doctors furnished by the Bird Machine Company. Twenty of these doctors are furnished on the first section of driers.

Over the entire machine is a 15 ton crane manufactured by the Shaw-Box Crane and Hoist Company, Muskegon, Mich.

The drying system for the drier section was furnished by the MidWest Fulton Company.

F. H. Blackman To Be Secretary

BOSTON, Mass., November 28, 1938—President John R. Halkyard, of the New England Paper Merchants Association, has appointed Floyd H. Blackman of the D. F. Monroe Company as voluntary secretary of the organization to fill out the balance of the year up to March.



Woodfibre Plant, Showing a Corner of New Bleach Plant in the Background.

B. C. Pulp & Paper Co., Installs Modern Bleach Plant at Woodfibre, B. C.

By Andreas Christensen, Tech. Advisor, B. C. Pulp & Paper Co.

During the past eighteen months, British Columbia Pulp and Paper Company, Limited, made material changes in both plants, at Port Alice and at Woodfibre, meeting requirements for uniform qualities of rayon pulps and developing the ability to produce what are referred to as custom made pulps for both rayon and paper making.

At Port Alice an extra stage was added to the beach plant, in order to provide a refining unit for rayon pulp, and an extra unit for high density hypochlorite treatment for paper pulp.

The success of this installation has been evident over several months of successful rayon manufacture as well as in connection with following some of the requirements for tonnage of high quality bleached sulphite for paper.

The developments at the Woodfibre mill in changing from unbleached to bleached pulp are outlined more fully, with accompanying photographs.

Bleach Plant at Woodfibre

Bleached sulphite was first manufactured on the Pacific Coast for export at Port Alice, B. C., which is situated on the northwest coast of Vancouver Island. For over twenty years the Port Alice plant of the British Columbia Pulp and Paper Company Limited, has served a long list of satisfied customers in many parts of the world, and its product has been used not only in making fine papers but also in rayon and cellophane manufacture.

With the demand for bleached sulphite from this mill far exceeding the output, it was decided to add a modern bleach plant to the Woodfibre mill and convert the entire output to bleached sulphite.

The Woodfibre mill of the British Columbia Pulp and Paper Company Limited, has a record of more than twenty-five years' operation, producing the well-known Glacier brand of easy bleaching sulphite. Being located only thirty miles from Vancouver on picturesque Howe Sound, it is ideally situated for a mill that competes in the world markets, as regular sailings are maintained between the Port of Vancouver and the Orient, Australia, Europe, South American, and the East Coast of the United States and Canada. The timber resources that the mill draws on are conveniently situated, and are such as to insure uniform quality of the finished product.

Process Water

An abundance of water containing only a minimum of organic and inorganic impurities is available from a number of glacier-fed lakes. This water enters the mill at a pressure in excess of four hundred pounds per square inch, and is distributed to a number of Pelton turbines to generate a part of the power requirements of the mill before it is used for process water.

From sixteen to seventeen million gallons of water are utilized daily as process water, and to guard against dirt from this source, it is all passed through sand and gravel filters before entering the mill. These filters are the largest pressure filters built to date, and were furnished complete by the Shibley Company of Seattle, Wash. The interior filter piping is treated by the Oxyseal process to guard against contamination of the water with iron, and all piping leading to and from the filters is continuous wood stave pipe. The quality of the water is such as no

chemical treatment is required either for boiler feed or process water.

The Unbleached Department

This part of the mill had been completely remodeled, less than two years ago, and is well equipped to produce a uniformly good quality of unbleached sulphite for the bleach plant. Addition of a Chemipulp hot acid accumulator insures a cooking acid of uniform strength and temperature throughout the year. All digesters are equipped with Foxboro automatic relief controllers, Bailey steam flow meters and gauge glasses, to insure uniform cooking conditions.

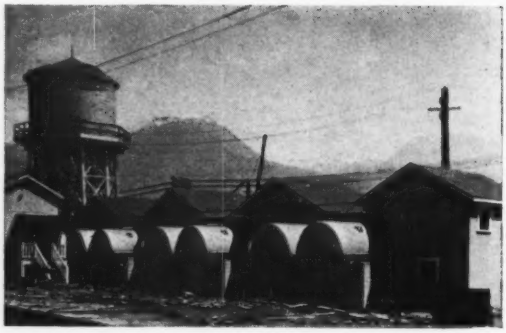
The digesters and acid accumulator are completely equipped with chrome nickel steel strainers, relief piping, pumps and valves insuring steady operation with a minimum of interruption. A novel feature of the digester operation is the system of emptying the digesters when the cook is finished. Instead of "blowing" the digesters under pressure, which is the customary procedure, the digester pressure is relieved down to zero and the liquor drained off through a perforated coil located in the bottom cone. Water is then added and the pulp given a wash in the digester before it is "Dumped." This method insures a better strength, and also gives the pulp a more thorough washing before it enters the bleach plant.

Bleach Plant

The Woodfibre bleach plant is without a doubt the most modern and efficient plant of its kind in the world today, and has been designed with the view of meeting the requirements for both high grade paper and dissolving pulps. It is in reality a laboratory built on commercial scale, and without being elaborate, has been equipped with every device necessary to insure the strictest control of the operation.

Building

Concrete has been used throughout the entire structure, both in the building proper as well as in the numerous bleaching cells and storage tanks. The pulp, however, is not allowed to come in contact with the concrete, as all surfaces to which the pulp is exposed in process of manufacture, as well as all storage tanks, are tile lined. In designing the building, special attention has been paid to elimination of dirt, uniform light throughout the twenty-four hours, proper ventilation and a high operating efficiency. The building measures 122 feet in length, 64 feet in width, and 55 feet in height above ground level. In addition to containing all the bleaching equipment, it also houses the bleach liquor make up and storage tanks, as well as electrical distribution and control room. Windows have been completely eliminated in the entire building, and a ventilating system introducing filtered air at the ceiling insures pleasant working conditions, and also keeps the building free from dirt. An exhaust fan, located in the basement, removes a quantity of air equivalent to the amount introduced. During the winter months, a thermostatically controlled heater insures uniform temperature of the incoming air.



THE WATER FILTRATION UNITS.

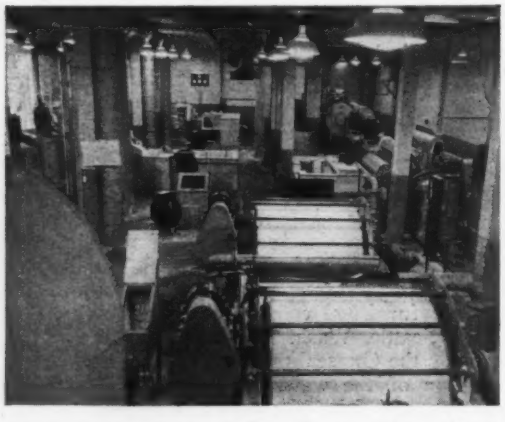
By erecting a windowless building, the continual changes in light have been eliminated, making for more uniform operating conditions, and consequently higher efficiency.

Lime storage, caustic storage and dilution tanks, as well as lime mixing tanks, are located in a separate building, and the various materials are transferred to the bleach plant with centrifugal pumps.

Bleaching Equipment

To insure the most exacting control of the operation, the entire plant is laid out on the Batch principle. The bleaching cells are all of the vertical type, and arranged for a three stage operation on paper pulp, and four stage operation on dissolving pulp, with pH control between stages as well as after the final washing.

Liquid chlorine is transferred from 30-ton tank cars to a scale drum, and after passing through the



A VIEW OF THE BLEACH PLANT OPERATING FLOOR, WITH NOS. 3 AND 4 WASHERS IN THE FOREGROUND.

THE FINAL STAGE OF BLEACHING SHOWING AGITATOR MOTORS, AND CONTROL PANELS.

evaporator, is introduced to the bottom of the chlorinators through Pyrex glass piping.

The pulp is washed acid on a rubber-covered Oliver filter, and transferred to the first stage hypochlorite bleaching cells with a belt conveyor. After bleaching, the pulp is emptied into a dilution chest directly below the bleaching cells. This chest is equipped with rubber-covered propeller type agitator, and from here the pulp is pumped to the second washer thickener, which feeds either the alkali refining stage or the final hypochlorite stage, depending on the type of pulp to be made. The final stage consists of six F. B. C. cells placed directly on top of large dilution and dump chest, which is equipped with two rubber covered propeller type agitators. From here the pulp is given a final washing before being delivered to storage chest, which is equipped with vertical, rubber-covered, shrouded propeller agitator.

Washing Equipment

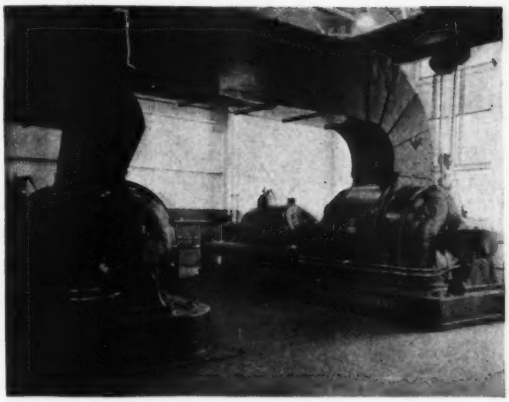
The washing equipment consists of four low density vacuum washers, operating without press rolls, and three washer thickeners for high density equipped with two press rolls each.

These washers are made by the Pulp Bleaching Corporation and Oliver United Filters, and are operated in either tile-lined, concrete vats or in rubber-lined, iron vats. Warm water is added to the cake of pulp between the press rolls, raising the temperature of the pulp before entering the bleachers. All press rolls are equipped with special lifting devices, operated by air and controlled from the washer panels.

A thorough mixing of stock and water is essential to accomplish efficient washing;—to insure this, all washers are equipped with specially designed headboxes with propeller agitators. In these machines, as well as in all other equipment in the bleach plant, care has been taken to prevent the pulp from coming in contact with iron. Head box mixing and agitating equipment, displacement water shields and cylinders, as well as press roll face and binding wires, are all made of chrome nickel steel.

Piping and White Water Recirculation

To aid in keeping the iron content of the pulp at a minimum, wood stave pipe has been used throughout the entire plant for handling fresh water, white water



1600 K.W. Additional Turbo Generator Units Recently Installed.

and slush stock, and all fittings which are of the fabricated type have been rubber lined.

Pyrex glass piping has been used extensively for handling chlorine gas, and lead piping with rubber-lined valves for bleach liquor.

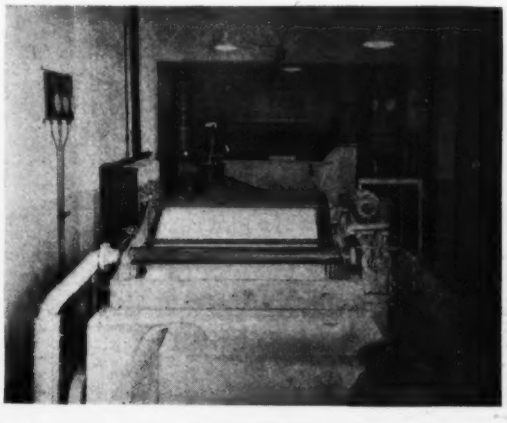
All valves throughout the entire plant, with the exception of the lubricated plug cocks used in the bleach liquor make-up system, are of the solenoid controlled, hydraulically operated type.

Filtered fresh water is available in sufficient quantities to permit wasting of the effluent from three of the seven washers, and re-using only the white water containing the lowest percentage of impurities, insuring the most effective washing of the pulp.

To take care of the intermittent heavy demand for white water which occurs when the bleaching cells are emptied, a storage tank has been erected on the roof of the bleach plant. The pump supplying this tank is controlled by an automatic float switch, and the accumulated water flows by gravity to the bleaching cells when they are dumped, the quantity being regulated by an automatic metering device which insures uniform consistency in the dump chests.

Control Instruments and Panels

Individual motor drives and reduction gears are used throughout the bleach plant to operate the va-



No. 6 Pulp Bleaching Corporation Washer in Foreground, Used Following Final Stage of Bleaching, and Rubber-covered Oliver Washer in Background, Washing Chlorinated Stock.

Basement View of the Bottoms of Circular Chlorinators on the Right and Dilution Chest Below Final Bleachers on the Left and Vertical Stock Pump in the Background.

rious machines,—these motors range in size from 3 to 250 hp.

Electric current is distributed from one centrally located control room, where all starting equipment and circuit breakers are located. Each machine is equipped with its own control panel on which are mounted push buttons for motors, switches for solenoids, pressure gauges, liquid level gauges, vacuum gauges, temperature recorders and other automatic and hand control equipment.

To gauge the quantity of fresh and white water used in the various washing operations, a number of individually mounted flow meters are conveniently located and act as a guide for the operators. Every effort has been made to synchronize the various stages of the operation in such a manner as to insure a uniform quality and high operating efficiency.

Bleach Stock Screens and Drying Machines

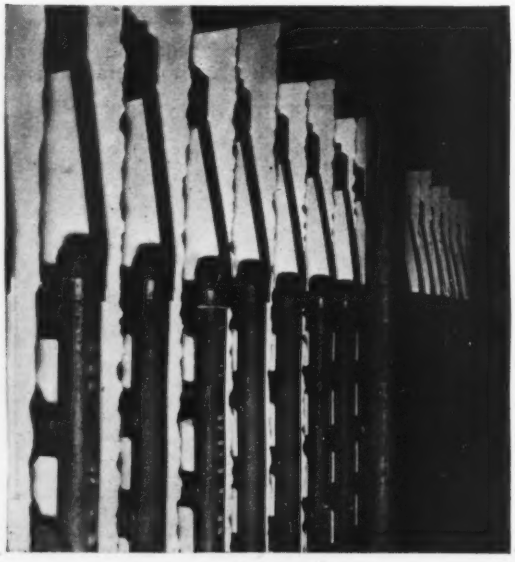
To insure maximum cleanliness, the pulp is re-screened and riffled after the final washing. The screening equipment consists of forty-two twelve-plate flat screens arranged in rows of 3 each, equipped with fine cut chromium plated screen plates.

After passing over felt covered rifflers, the pulp is thickened and delivered to the two large blending and storage tanks, located outside of the machine room building.

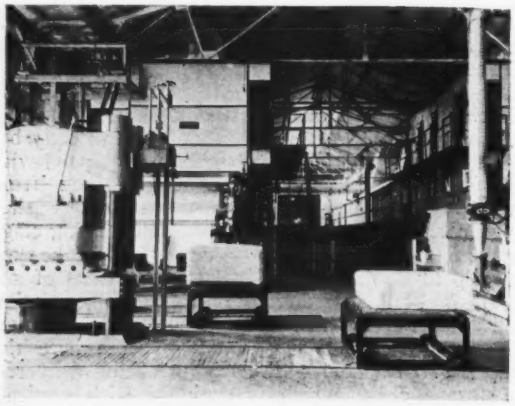
The drying equipment consists of two Fourdrinier machines equipped with variable speed drives, capable of producing a sheet of uniform dryness, basis weight and calibre to meet the exacting demand of dissolving pulps.

The wet end is equipped with three presses, of which the third press is reversible, and also predriers between second and third press, and delivers the pulp sheet to the drier section more than 50 per cent air dry. Drying of the pulp is accomplished with the conventional steam heated drying cylinders at low pressure, and surface temperature up to about 65 per cent bone dry, and the drying completed in Flakt driers.

In the Flakt driers, the pulp does not come in contact with the hot drying elements, but passes between



A Sheet of Pulp in Flakt Drier.



The End of the Machine Room, Showing Flakt Driers and One of the Hydraulic Presses.

rows of heating coils, and the moisture is removed in a current of warm air. By this method, a sheet is produced that breaks up readily in the beaters, and no loss of strength and color is in evidence, as might occur when the pulp is in contact with any hot drying surface after the critical point in drying, of 65 per cent bone dry, has been reached.

The Flakt driers at Woodfibre are the first installation of this kind in Canada. In European pulp producing countries, these driers have found universal application, partly on account of the superior quality of pulp which it is possible to produce by this method of drying, and also due to the low drying cost.

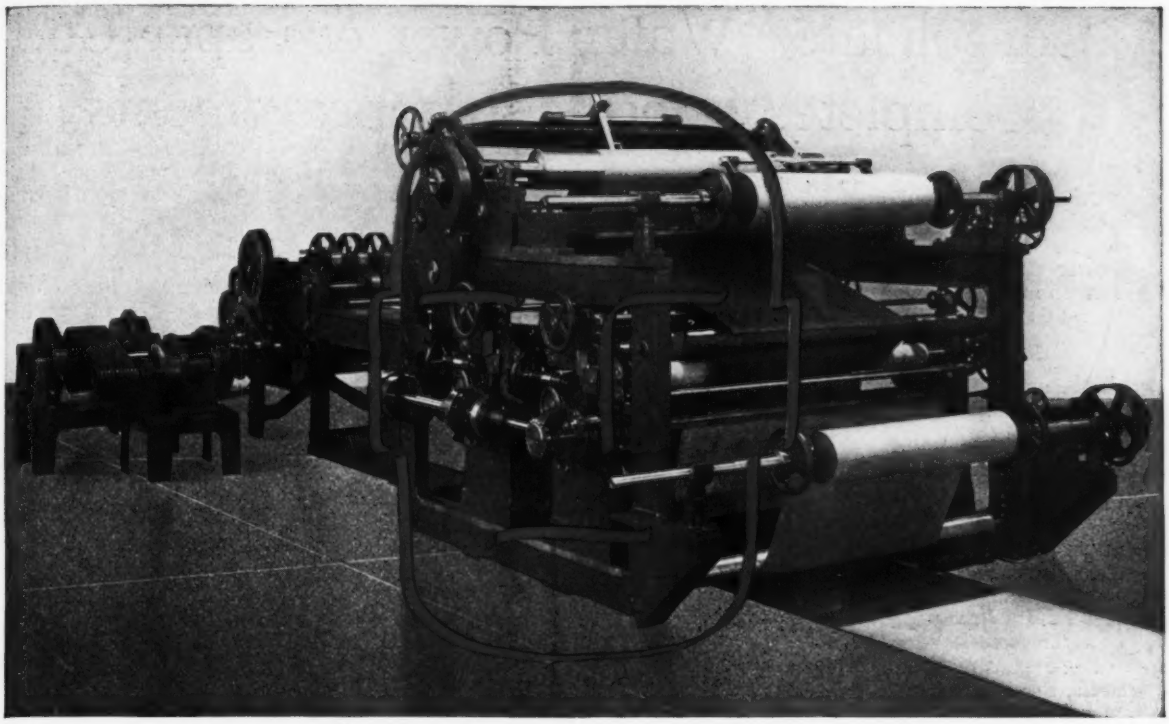
A staff of trained chemists is constantly on duty to check on every phase of the operation, and also supply the operators with the information necessary to enable them consistently to turn out a product that meets the required specifications. The technical department consists of main laboratory and two control stations, conveniently located to serve the various operating departments of the mill.

The chief function of the main laboratory is to check the physical and chemical properties of the pulp before shipment is made. It is well equipped with the latest scientific instruments to do this work, and all physical tests are carried out in a constant humidity room to insure uniform atmospheric conditions at all times.

Mill and laboratory research and development work is also carried out under the direction of the technical staff, and every effort is made to insure the production of a pulp of uniform quality.

Parsons Paper Improves Fourdrinier

The Parsons Paper Company, Holyoke, Mass., which has been occupied for some time in remodelling and modernizing its manufacturing equipment, recently completed alterations to its largest Fourdrinier machine. The machine has been lengthened and speeded up to embrace more versatile manufacturing possibilities. A complete new foundation was constructed, the entire machine-room made over to accommodate the enlarged machine and the drive was rebuilt completely with Cleveland worm gear units. Other improvements include new Emerson Jordan, all new copper piping, new stuff pumps, a battery of four centrifugal screens, a large Bird screen, a continuous weight scale, size tub controls, a Verigraph moisture controller, and twice as many driers equipped with condensate units.



It Thinks . . .

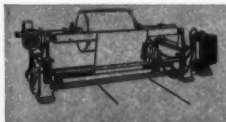
Smith & Winchester engineers adapted the photo-electric cell (electric eye) to S & W's improved straight line Paper Bag Tuber. Result: seam variations are held to 1/16″ plus or minus, regardless of unevenly wound or badly dished rolls.

From previously printed rolls the printing variations are held to 1/8″.

And the speed is 600 feet a minute, or more.

Without increasing the number of machines you have in use, or your space, *or* your man power—you can make production leap ahead by replacing present machines with this new development.

Complete data and quotations on S & W Paper Bag Tubers and Bottomers will be sent to you without obligation. Have your secretary drop us a note asking for it.



SIDE REGISTER CONTROL Photo-electric eye keeps paper edge in straight line from uneven rolls. Adaptable to bag machines, printing presses, coating machines, etc.

JORDANS 4 standard sizes handle 3 to 45 tons per 24 hours. Steel caps eliminate shrunk-on bands. Dovetailed knives in cone. Bulletin 7

BOTTOMERS For all sizes of satchel or valve bottom paper bags, single or multi-wall. Write for bulletin.

ROTARY CUTTERS For cutting printed matter with compensator for registering. Write for information.

UNDERCUT TRIMMERS On finest grades — to boards. Cutting edge is up, not down. Dual Control — both hands below table. Sizes: 48″ to 92″ wide. Write for yellow bulletin.

Also write for information on Fourdriniers; cylinder and wet machines; slitters and calenders; reels and winders; [illegible]; stuff pumps; shower pipes

The SMITH & WINCHESTER *Manufacturing Company*

ONE HUNDRED AND TEN YEARS OF ADVANCEMENT

PLANT AND OFFICES AT SOUTH WINDHAM, CONN.

Consolidated Water Power & Paper Co. Completes Important Improvements

A huge expansion program, begun last summer, was brought to completion in May at the Wisconsin Rapids and Biron plants of Consolidated Water Power and Paper Company. All work was performed in record time, with new equipment placed in operation well in line with dates estimated.

Rice, Barton & Fales Fourdrinier

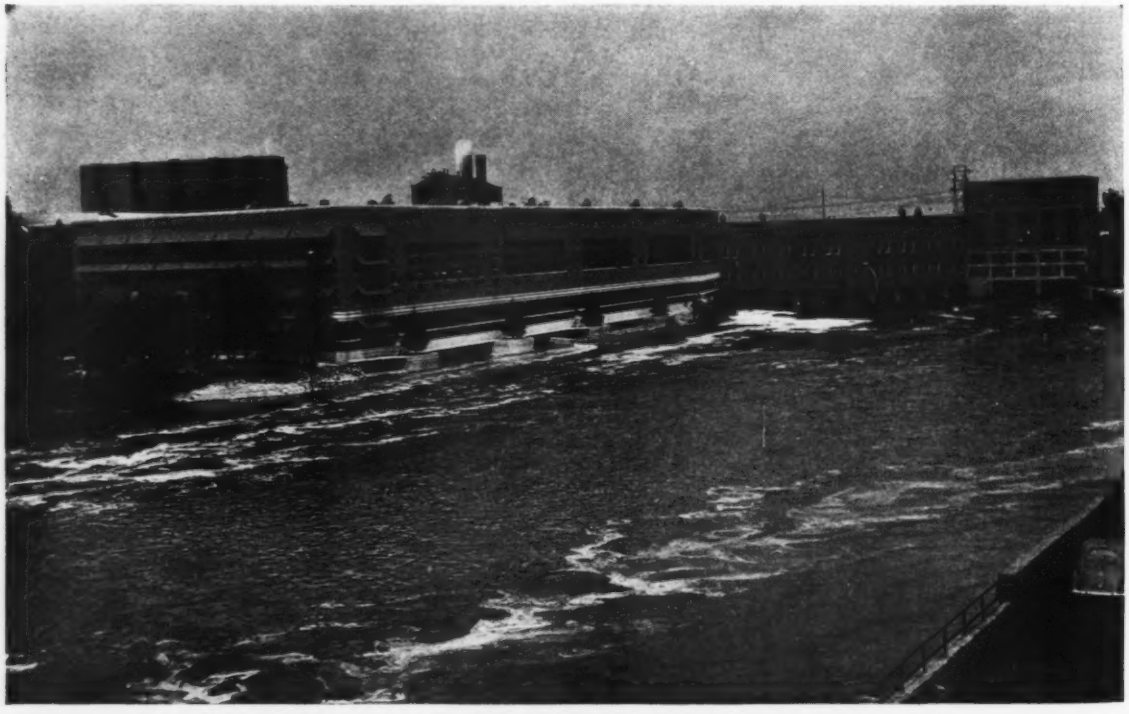
The new No. 5 machine, built by Rice, Barton & Fales and installed at the Wisconsin Rapids mill, started up February 1 and has run continuously since that date, averaging now 85 tons per day and making the company's coated paper for *Life Magazine*. This machine occupies a large modern machine room constructed east of the other three machines. The company now operates six machines at Wisconsin Rapids, Biron and Stevens Point, with the company's patent coating process. This coating operation is an integral part of the paper machine itself and is capable of turning out large production.

No. 5 Machine is also equipped with a Beloit dual press, Briner economizer, and other features essential to strictly modern manufacturing practice.

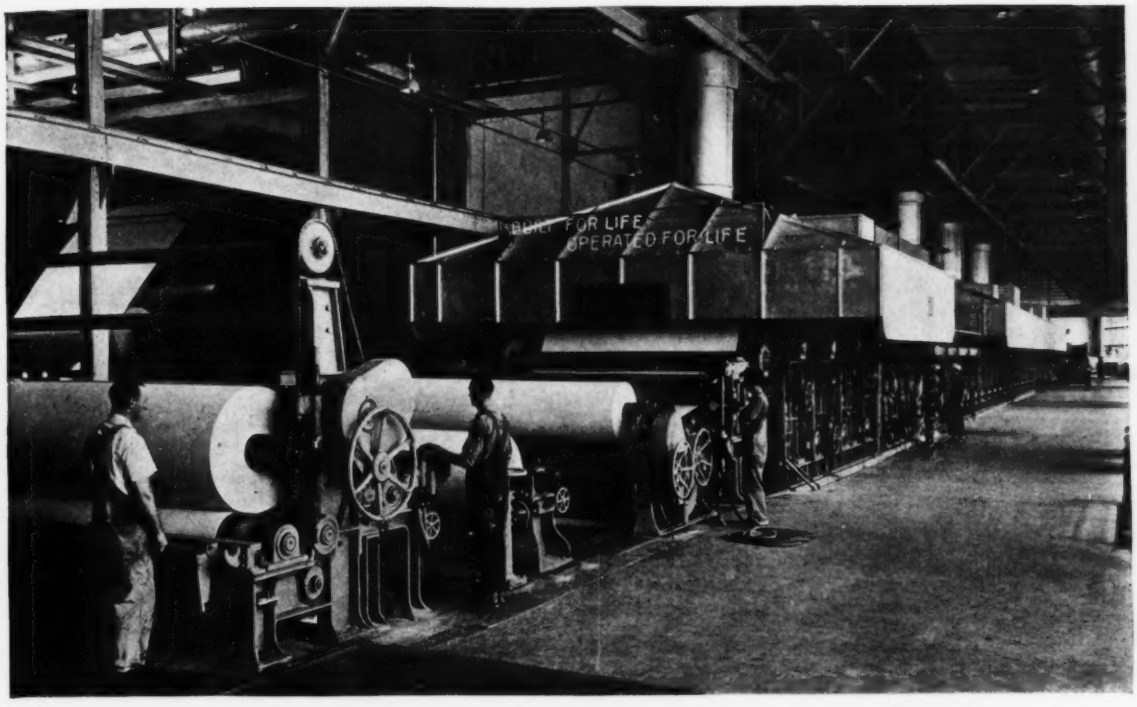
Along with the new machine room, the company constructed a large finishing room addition which contains the supercalenders and winders. Two 130 inch supercalenders were installed since the first of the year making five supers in all. In the sheet department four single sheet cutters have been installed and are in full operation.

VIEW OF ENLARGED SULPHITE PLANT.

To provide additional sulphite for the new paper machine the company enlarged its sulphite mill, adding three new digesters, making a total of eight. The bleach plant which formerly operated two first stage and three second stage high density bleachers, has changed its process to the direct chlorinator system with the intermediate caustic stage.



VIEW OF MILL AT WISCONSIN RAPIDS WITH NEW ADDITION IN THE FOREGROUND.



No. 5 Fourdrinier Which Produces 85 Tons of Coated Paper Daily for Life Magazine.

To accomplish this change, four Fletcher bleachers and six chlorinators were installed in a north addition to the bleach plant. The capacity, formerly 88 tons of bleached sulphite per day has been increased to 140 tons.

Extensive Boiler Plant Alterations

Additional steam and power demands have been taken care of by extensive boiler plant alterations. Two of the company's four high pressure boilers have been equipped with water walls and extended stokers. In the turbine room the original 5000 K.W. unit is re-vamped by the removal of the second extraction mechanism and the installation of a complete spindle, diaphragm generator and exciter to produce 7500 K.W. per hour. In addition to this a new back pressure turbine was purchased and installed. This unit operates at 5000 K.W. capacity.

A second 10-inch pipe line, now operating, conveys bleached sulphite from Wisconsin Rapids to the Biron mill, using the old pipe line as a medium for whitewater return.

At the Biron mill, an addition was built to No. 3 machine room and finishing room the new structure being 96 by 124 feet. In this space are three new supercalenders, two new 150-inch winders together with cutters and other conversion equipment which was formerly in use. Railroad tracks have been extended into the basement of this addition.

The largest paper machine at the Biron mill is now equipped with the company's coating device and is operating successfully.

This coating operation has also been introduced in the two Yankee machines at the Consolidated Companys Stevens Point Division, where the opportunity presented itself to produce an opaque M. G. sheet by the application of coating to the unglazed side.

These various expansion projects at Consolidated mills began in June 1937. All work was designed by the company's engineers and performed by workmen hired direct by the Consolidated Company.

Distributors for Hewitt Rubber Corp.

Of special interest to the paper industry is the announcement of five new distributors by the Hewitt Rubber Corporation, Buffalo, N. Y. The following are now operating under the exclusive Hewitt franchise plan:

Philadelphia—Joseph Glenn & Sons, and their affiliate, E. P. Alexander & Sons (Clifton Heights, Pa.).

Indianapolis—Tools & Supplies, Inc., a new firm headed by E. W. Bromwich.

Seattle—Campbell Hardman and Supply Company.

New York City—Laurence Belting Company, Inc.

Allentown—Everson Electric Company.

Each distributor carries a full line of Hewitt hose and transmission and conveyor belting, and specializes in "spot" warehouse deliveries. The ready availability of competent engineering service is also stressed to both actual and potential customers.

Ingersoll-Rand Products for Paper Mills

Equipment for pulp and paper mills is the subject of an eight-page bulletin recently published by Ingersoll-Rand Company, 11 Broadway, New York City. Illustrated in the leaflet are such diverse types of equipment as pumps, compressors, pneumatic tools for construction and repair work, condensers, diesel engines, refrigerating units, and vacuum pumps. Copies of the folder, Form 2273-A, are available on request.

Electrification of Southern Paper Mills

By R. R. Baker, Industrial Engineer Westinghouse Elec. & Mfg. Co.

The extensive construction work recently carried on in the new pulp and paper mills in the South has resulted in many improvements in power generation, distribution, and utilization. This construction work has included the complete erection of 13 mills having a total productive capacity of 4,000 tons of Kraft pulp and 3,000 tons of Kraft paper and board daily. This productive capacity requires an installed generating capacity of some 126,000 KW and an installed motor capacity of some 150,000 h.p. The proper selection and application of the electrical equipment for these properties has been of extreme importance as the layout of this electrical equipment materially affects the operating cost of the mills. The initial cost of the electrical equipment for these properties probably exceeded $7,000,000, and the power cost alone for operating them at full capacity will probably exceed $2,500,000 per year. The importance of this problem of the proper selection of the electrical equipment is evident when we realize that the carrying charges for the initial investment in the electrical equipment together with the operating power cost amount to some $3.00 per ton of pulp roduced.

Important Factors in Laying Out Plants

A few of the important factors which the designing engineer has taken into consideration in the laying out of these plants are: thermal efficiency of the prime movers; the development of as much by-product power as is economically possible from the process steam requirements; plant productive efficiency, continuity of service as well as coordination of the various plant processes. These various criteria must be applied to all of the steps in power application including power generation, distribution, and utilization.

A study of the boiler plant designs indicates that these mills all generate steam at relatively high pressures and temperatures. Eight mills representing approximately 65 per cent of the productive capacity generate steam at 450 pounds pressure, and four of the mills representing approximately 30 per cent productive capacity at 600 to 650 pounds pressure. Initial steam temperatures range from 700 to 750 degs. F. The industry requires large quantities of process steam at a temperature level corresponding to approximately 150 pounds pressure for the digesters and at a temperature level corresponding to 50 pounds pressure for paper drying, black liquor evaporation and water heating. With these higher boiler pressures and temperatures, this demand for process steam makes it possible for the mills to generate a large block of their power requirements as a by-product of the process steam requirements.

Bleeder Type Highly Developed

The bleeder type turbine unit, which serves to extract the mechanical energy available in the steam as it expands from the initial pressure to lower pressures and temperatures at which it may be used for process purposes, has been developed to a high state of perfection. Various arrangements of this type of turbine generating equipment have been installed, including a combination of single bleeder units, one or more units taking steam at boiler pressure, bleeding at 150 pounds pressure and exhausting at 50 pounds pressure, operating in parallel with one or more units taking steam at boiler pressure, bleeding at 50 pounds and operating condensing. Double bleeders have also been applied, taking steam at boiler pressure, bleeding at both 150 and 50 pounds and operating condensing. These turbines are equipped with governors which permit maintaining a uniform mill frequency and bleeder pressure when variations in load, as well as in the process steam demand, are imposed upon the units. These modern governing devices serve to maintain uniform operating conditions throughout the mill and they go a long way towards improving the quality of the product and increasing the mill production.

It is of interest to note that many of these modern paper mills have little or no standby generator capacity when operated at a full production schedule. This is possible only because of the extreme reliability of the modern turbo-generating equipment. The units are designed with ample factors of safety which permit of long schedules of continuous operation with only periodic inspection during short shutdown periods in the production schedule. Due to these rigid requirements the modern turbine generating equipment for paper mill service must be provided with the various forms of protective devices to prevent damage from faulty operation. Such devices include suitable relays for overload as well as differential protection and generator temperature indicators. An adequate supply of cool clean air for the generators is required to assure operation at full load over extended periods, and for this purpose the units are provided with air coolers and suitable enclosures for maintaining proper air circulation and for keeping out dust and dirt.

Proper Power Distribution

In addition to the consideration of proper power

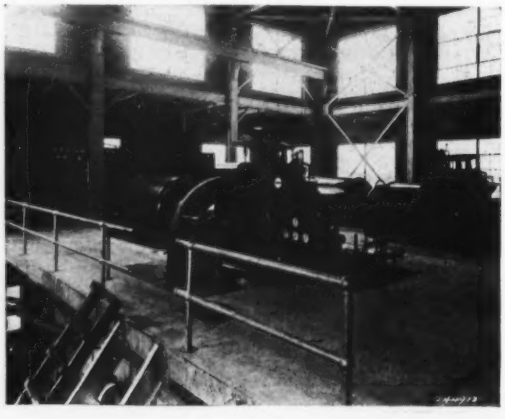


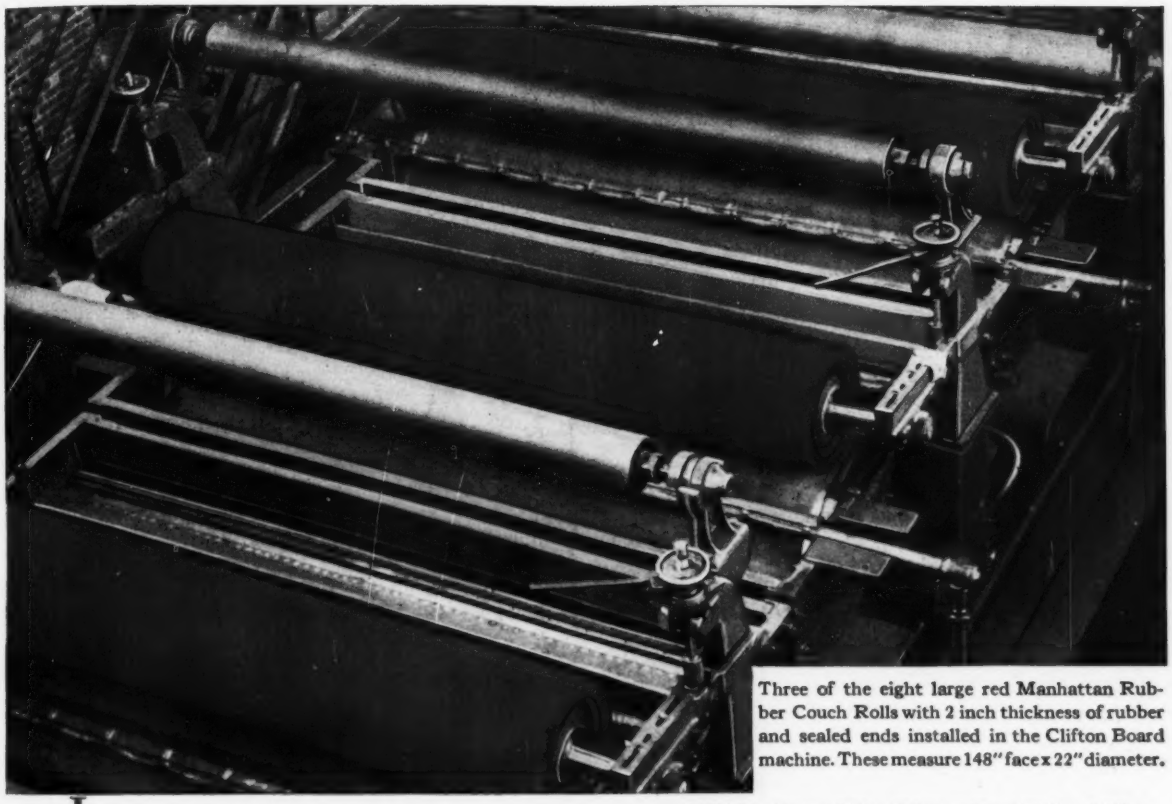
FIG. 1.

This modern power plant delivers both process steam and power economically to a large Kraft paper mill. It consists of a 3000 Kw., 150 lb. extraction, 60 lb. back press non-condensing bleeder turbine and a 3500 Kw., 60 lb. extraction, 28 inch vacuum condensing bleeder turbine, both taking steam at 400 pounds initial pressure.

NEW GIANT CLIFTON CYLINDER MACHINE

Equipped with

MANHATTAN ROLLS



Three of the eight large red Manhattan Rubber Couch Rolls with 2 inch thickness of rubber and sealed ends installed in the Clifton Board machine. These measure 148" face x 22" diameter.

ILLUSTRATED above is a section of the Wet End of the new giant Board Machine recently installed at the Clifton Paper Board plant at Clifton, New Jersey. Three of the eight vats each equipped with red Manhattan Couch Rolls are shown. In all, 46 Manhattan Rolls on this machine, which is probably the largest of its type, perform a major task of keeping production at a peak. The rolls consist of:

8 Couch Rolls—148" face x 22" finished diameter. (Rubber Coverings 2" thick.)
17 Rubber Covered Plain Felt Rolls—148" face x 9⅜" finished diameter.
8 Rubber Covered Wormed Felt Rolls—148" face x 9¾" finished diameter.
2 Rubber Covered Suction Primary Press Rolls—152¾" face x 24" finished diameter.
1 Rubber Covered Suction First Press Roll—150½' face x 26" finished diameter.
1 Rub-Roc Top First Press Roll—150" face x 24" finished diameter.
2 Rubber Covered Bottom Press Rolls—148" face x 24" finished diameter.
2 Rubber Covered Top Primary Press Rolls—148" face x 16" finished diameter.
2 Rubber Covered Top Primary Press Rolls—148" face x 18" finished diameter.
3 Rubber Covered Draw Rolls—148" face x 9⅜" finished diameter.

This installation is only one of many where Manhattan Rolls have been specified for original equipment. On this installation, as on all the others, Manhattan engineers worked in close cooperation with both the machine manufacturer and paper company in specifying the correct rolls for each function.

From their experience with Manhattan Rubber Covered Rolls over many years, prominent machine builders and principal paper manufacturers have been accustomed to relying on Manhattan for rolls that give economical and efficient service for long periods.

On your next roll installation or replacement, let Manhattan make specific recommendations.

Paper mill rolls are also rubber covered by Manhattan at their Fox River Valley plant, Neenah, Wisconsin, and at their plant in North Charleston, South Carolina.

THE MANHATTAN RUBBER MFG. DIVISION
OF RAYBESTOS-MANHATTAN, INC.
EXECUTIVE OFFICES AND FACTORIES, 58 TOWNSEND ST., PASSAIC, N. J.

generation, consideration must be given to the subject of proper power distribution. In general, the fundamental requirement of adequate circuit protection, so essential to continuity of service, has been met. All of the properties are designed for power generation and primary distribution at 3 phase, 60 cycle, 2300 volts, with secondary distribution for the smaller motors at 440 volts.

Many of the properties have taken full advantage of the enclosed type of switching equipment of either cubicle or metal clad construction. Such equipment is completely factory built and delivered to the mill location fully assembled, requiring only generator and feeder service and external control wiring connections. Such construction assures proper alignment of component parts, adequate insulation and clearances and a fully housed structure which may be readily inspected and serviced. Such structures also afford the maximum safety to the mill operators.

Electrically and Manually Operated Breakers

The 2300 volt generator and feeder circuit breakers have been of the conventional types provided with modern arc interrupting devices and selected in conformance with the particular mill requirements as to maximum continuous and short time current capacity, as well as maximum interrupting capacity. Both electrically operated and manually operated breakers have been applied.

In the majority of installations the 2300 volt switchgear provides rheostatic type voltage regulating equipment for the main generating units, instruments for indicating the bus frequency, instruments for synchronizing the generating units when more than one unit is installed, and suitable 3 phase ground detectors. Each generating unit is provided with D.C. indicating voltmeter and ammeter for the generator field circuit and A.C. indicating voltmeter, ammeter, and polyphase wattmeter. The 2300 volt feeder switchgear provides overload relays for each circuit and usually includes an indicating ammeter and ammeter switch for reading the current of each phase.

In addition to the equipment as indicated above, many of the mills have installed watthour meters on the main and essential feeder circuits and recording instruments on the main bus and generating units. Apparently many of the operating companies fully appreciate that operating cost can be more accurately controlled and uneconomical practices quickly detected and corrected by an adequate metering of the power service.

FIG. 2.
Cubical type 2300 and 440 volt switchgear controlling the main generating equipment and distributing power to a large Kraft pulp mill.

FIG. 3.
2200 volt cubicles mounted in pairs for the control of eight 350 hp. synchronous Jordan motors.

Difference in Operating Practice

It has been quite general practice in the Southern mills to operate motors 50 to 75 h.p. and below at 440 volts and motors above these ratings at 2200 volts. This practice in the mills producing both pulp and paper requires transformer capacity equivalent to approximately 30 per cent of the installed motor capacity, whereas, in mills producing only pulp the transformer capacity is more nearly 70 per cent of the installed motor capacity. There appears to be a difference in operating practice among the mills in connection with the transmission for the 440 volt mill motors. Certain of the mills have installed suitable transformer capacity for the entire 440 volt mill load in one centrally located transformer bank. 440 volt feeder circuits radiating from this central point to the 440 volt motor control centers have been installed with such installations. Other mills have installed either indoor or outdoor transformer banks at the various 440 volt mill load centers feeding the 440 volt motor control centers located at these points directly from these transformers. With this arrangement 2300 volt feeder circuits are provided radiating from the main power bus to the transformer primaries. Satisfactory operating results have been obtained with both methods, and the method selected depends largely upon the relative cost of transformers, switching and feeder circuits involved.

In the mills using a centralized bank of transformers with 440 volt feeder circuits, the recently developed de-ion air circuit breakers have been successfully applied. These breakers are equipped with overload trips having time delay features on modern overloads and instantaneous trips under short circuit conditions. They are compact units having high interrupting capacity and are exceptionally well adapted to an economical feeder switchboard layout.

General Practice To Group Controllers

For the control of both the 2200 and 440 volt mill motors it has been almost universal practice in these Southern properties to group the controllers in distribution centers using a common bus structure for

the various control units and providing for remote operation from pushbutton stations.

For the 2200 volt motor controllers, cubicle type of construction has been used almost exclusively. As with the 2300 volt switching equipment, these units are factory built and are delivered on the property completely assembled. This type of control has been installed with the larger motors of both synchronous and induction type and has also been furnished for both full and reduced voltage starting.

A typical motor cubicle for control of one of the larger 2200 volt induction motors consists of a three conductor copper bus carried at the top of the cubicle and running continuously throughout the group of cubicles forming the distribution center. The bus structure is enclosed providing isolation from other apparatus, and it may or may not be equipped with barriers between individual buses. Taps from the bus are taken to disconnecting switches located in the upper portion of the cubicle. The disconnect switches are connected to oil circuit breakers located in separate compartments in the lower portion of the cubicle. Under voltage protection is provided by either instantaneous or time delay tripping devices. The 2200 volt cubicles for synchronous motor control are similar except that the necessary provision is made for automatic motor field application and for re-synchronizing where the motor application will permit. Proper metering equipment is located on the front of the cubicle and the synchronous motor controllers include ammeters for both line and field circuits.

Advantages Over Older Forms

Although there are many variations in the construction of the 2300 volt cubicles as covered by the foregoing description, this general type of control affords many operating advantages over older forms. All live circuits are totally enclosed, doors are interlocked, and ample clearances are provided for inspection and maintenance. The remote pushbutton control provided permits inexperienced operators to safely operate the control. The equipment is installed in the minimum of time and at a minimum of expense.

The boric acid high voltage fuse, which was developed comparatively recently, has been applied in

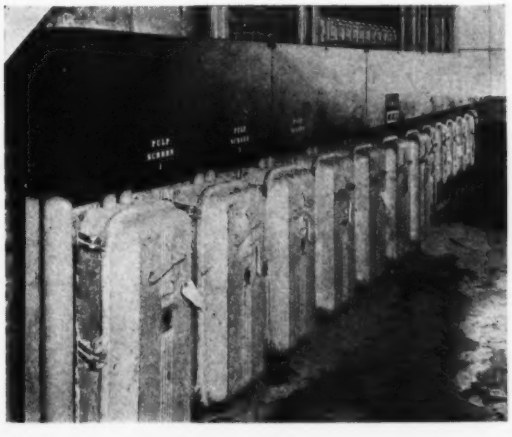


FIG. 4.

A 440 volt motor control distribution center consisting of a group of combination full voltage magnetic starters and no-fuse disconnecting breakers in watertight cabinets.

FIG. 5.

The utmost simplicity of the power layout characterizes sectional drive as applied to this and other paper machines.

a number of these Southern mills in connection with the 2300 volt distribution. This fuse has the following interrupting ratings:

7.5 KV—200 ampere class—25,000 ampere interrupting ability
7.5 KV—400 ampere class—35,000 ampere interrupting ability

The fuse serves to clear shorts of various magnitudes in the following time periods:

3,000 amperes	3 cycles
5,000 amperes	2 cycles
10,000 amperes	1 cycle

Construction of the fuse is such that it may be used as a disconnect switch. When applied in this manner the fuse not only replaces the disconnect switch but, due to its ability to clear short circuit currents rapidly, it extends the short circuit current capacity of either the oil breaker or oil immersed contactor used in conjunction with it. The fuse elements of these boric acid fuses are renewable and renewable elements are readily replaceable in the permanent fuse structure.

The typical 440 volt motor control center consists of a common bus structure and a number of conventional type full voltage magnetic starters with no-fuse circuit disconnecting breakers mounted either individually or in a common cubicle steel structure. Each motor control is arranged for remote operation and is provided with the necessary pushbutton control station for location near the machine to be controlled.

Three Principal Types of Drives

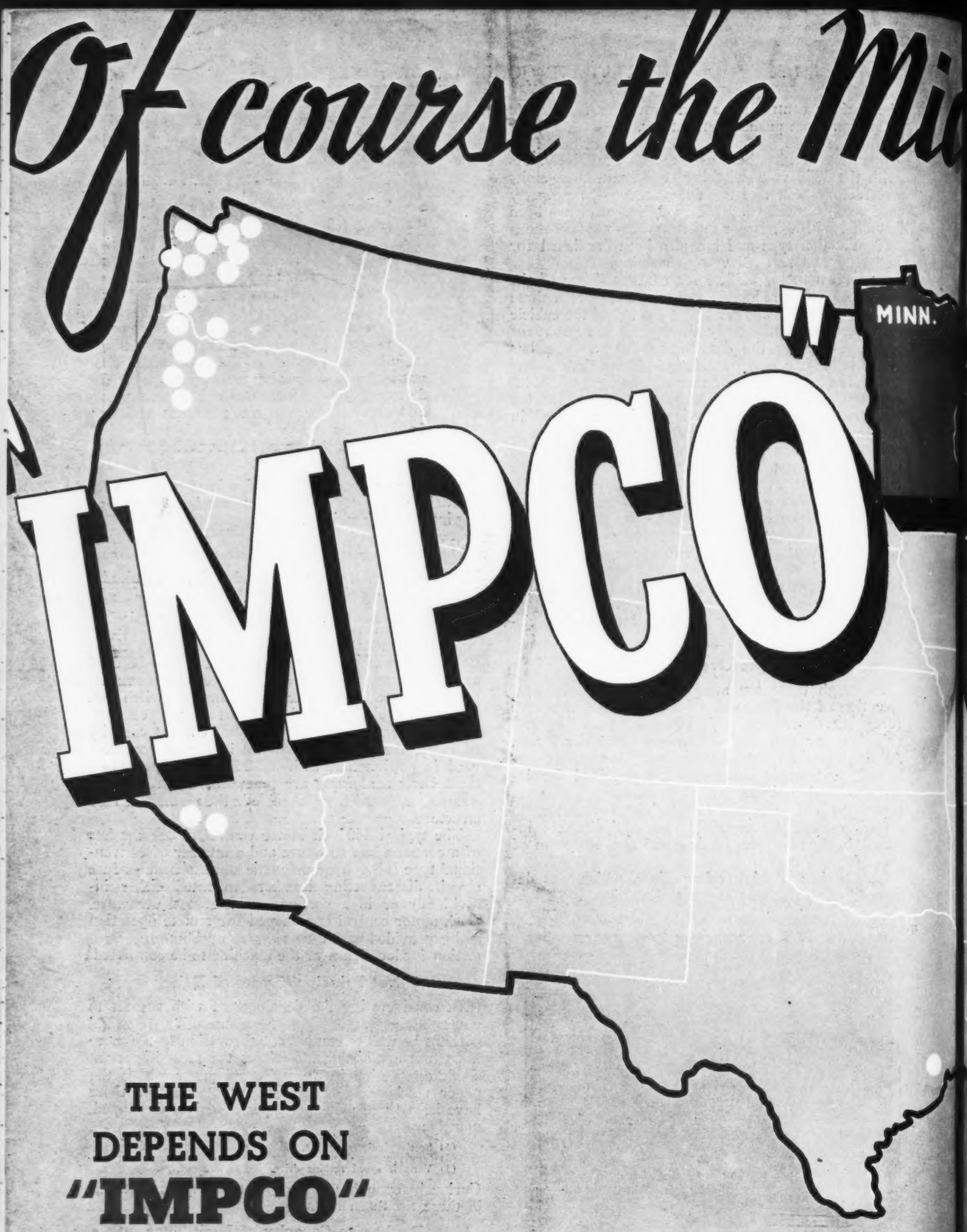
In considerating the development with respect to power utilization in these Southern mills, it would perhaps be well to confine our discussion to the more important applications. Perhaps the most important single application in the pulp and paper mill is the paper machine. For this important machine there have been three principal types of drives developed, namely:

(1) Sectional electric drive.
(2) Single motor drive.
(3) Variable speed turbine drive.

Curiously enough we find all three types installed in these Southern mills.

Productive Capacity of Each Type

The following tabulation represents the number of machines, the number of mills, and the percentage of productive capacity represented by each type:



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Type Drive	No. Mills	No. Machines	Per cent Total Productive Capacity
Sectional	8	10	59
Variable speed turbine	2	4	33
Single motor	2	2	8
Total	12	16	100

The sectional drives are of the latest type providing D.C. motors and reduction gear units with automatic control and speed regulation for the individual sections of the machine. Power for the D.C. motors is supplied by motor generator sets or turbine driven D.C. generator of the proper capacity. To provide maximum flexibility for the control so as to obtain the highest possible productive efficiency on the machines the control of each individual section is completely automatic from pushbutton stations located on the front side of the paper machine. The various sections are also provided with remote draw adjusting devices which are also located at convenient points on the front side of the machine. The line shafting belts and clutches required with either single motor or variable speed turbine mechanical drive are eliminated and the floor space ordinarily occupied with the lineshaft is available for other purposes. Each individual section is provided with metering equipment which indicates the power loading and therefore serves as a guide in both operating and maintaining the paper machine. The elimination of all line shafting losses increases the mechanical efficiency of this form of drive over the mechanical drive. Due to the fact that the power for the sectional drive in practically all instances is obtained from the large power house turbine generating units they are able with sectional drive to maintain a very high overall thermal efficiency at all operating speeds of the paper machine.

Recent Improvements

Recent improvements have been made in variable speed turbine drives. The governing mechanisms have been adapted to adjustable speed operation as required for paper machine service. These new type governors are now capable of maintaining satisfactory operating speeds over the required operating speed range of the paper machine.

The single motor paper machine drives are of the conventional type with adjustable speed D.C. motors and motor generator sets for supplying power to the direct current motor. The main D.C. controls are fully automatic and provided with motor operated rheostats for speed adjustment. These controls provide for present speed. One of the single motor drives is equipped with speed regulating equipment, whereas the other is dependent on the inherent characteristics of the D.C. units for maintaining speed regulation.

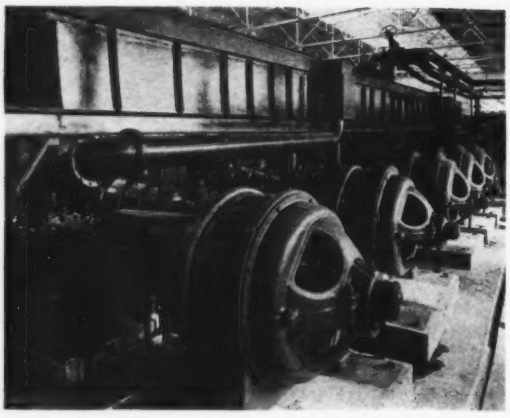

FIG. 7.
Part of a group of 26 synchronous motors totalizing 9,200 hp., direct coupled to Jordans.

The use of synchronous motors throughout the mills permits operating at high power factor, thus making the full KVA of the main generating unit available for useful loads. In conformance with general practice synchronous motors have been direct connected to the chippers and Jordans. These direct connected units require a minimum of floor space and therefore permit of lower building construction costs. Due to the high operating efficiencies of these synchronous units and the elimination of wearing parts with direct connected drives, they require a minimum of operating expense when compared with other forms of drives.

In those mills producing paper and board, both D.C. and A.C. winder drives have been applied. The D.C. winder drives are of the variable voltage type

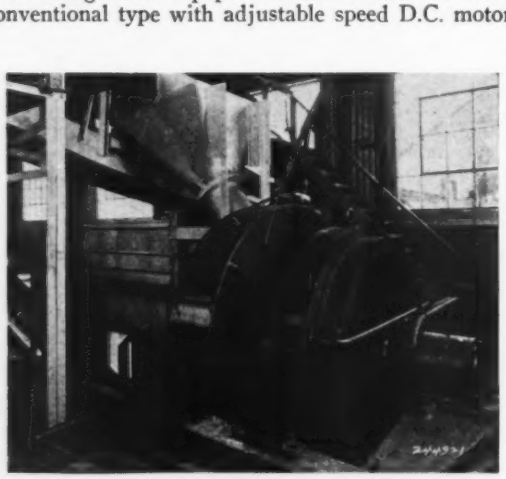

FIG. 6.
Occupying a minimum of floor space, this 250 hp., 257 rpm. synchronous motor driving the chipper contributes to maintaining a high power factor in this Kraft paper mill.

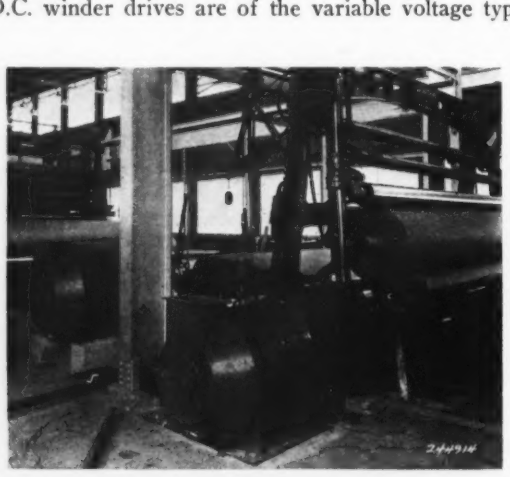

FIG. 8.
Variable voltage direct current winder drive with regenerative braking produces evenly wound roll with a minimum of power consumption.

with suitable motor generator sets for providing power to the winder motors. A noteworthy development in connection with these D.C. winder equipments is the regenerative braking with automatic tension control applied to the unwinding stands. This arrangement permits maintaining a uniform tension in the sheet between the unwinding stand and the winder which is very essential in the formation of a uniformly wound roll. This method also permits recovering and returning to the mill bus the large quantity of energy which would ordinarily be dissipated in the conventional mechanical brake, resulting in rapid wear of these mechanical parts.

Two speed wound rotor induction motors have also been applied to the winder drive. Such drives, although not providing the regenerative braking feature, the wide range of operating speed, or the uniform threading speed of the D.C. equipment, give fairly satisfactory results. Threading speed is obtained by using the low speed motor winding together with full resistance in the secondary of the wound rotor motor. Speed adjustments are made by adjustments of the secondary resistance. For the higher winding speeds required, the motors are operated on their high speed windings.

The excessive amounts of water used throughout the paper mill make it necessary to provide protection for the motor winding. To meet these conditions many motors throughout the mill are of the splash and drip-proof construction. Such motors are provided with special enclosures and baffles which prevent the water from entering the windings even though the motor undergoes a direct hosing. The baffles are so arranged that they do not materially restrict the motor ventilation. Under these moisture conditions the cubicle type 2200 volt motor control and the 440 volt distribution centers together with watertight pushbutton stations have gone a long way towards eliminating control difficulties caused by the presence of excessive amounts of water.

The numerous mechanical conveyors required throughout the wood storage yards, in the wood rooms and between various parts of the mill, all require comparatively low speed in driving shaft. Gearmotors have been quite generally applied for this service. If they are to be located outdoors they are arranged for outdoor service and if they are to be indoors they are either of the open type or provided with the necessary type of protective enclosure.

Advancement in Power Utilization

A study of these Southern mills indicates quite definitely the advancements which have been made in the generation, distribution, and utilization of power. Large quantities of power and steam are required in the processes and their use enters quite largely into the costs of the finished product. Developments in the bleeder turbine units, switchgear, motors and control have resulted in marked economies in plant operation. These results have been accomplished by an exceedingly careful analysis of the mill requirements and through the selection of the proper types of electrical equipment.

Earl Rowe Heads Great Lakes

TORONTO, Ont., November 28, 1938—Earl Rowe, former Ontario Conservative leader, has been elected president and director of Great Lakes Paper Co., Ltd., it was announced today. Mr. Rowe succeeded C. H. Carlisle, resigned.

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E. B. Eddy Co. Ltd. Carries Out Major Improvements At Hull, Que.

By A. N. Ball, Chief Engineer

There were two more or less major improvements carried out by the E. B. Eddy Company, Ltd., at its plant at Hull, Que., during the year 1938 the first improvement of major importance being the erection of a 50-ton bleachery in conjunction with a wet machine and pulp storage building, and the second improvement, the installation of a ten inch steam line with a four inch condensate return line, each some 4,300 feet long, running between what are known as the Upper and Lower Mills of the Company. Both of these projects were in operation early in 1938.

To Centralize Steam Plant

The purpose of the steam line installation was to centralize the steam plant at one point with its obvious economies. This was accomplished by placing water backs in the existing boiler furnaces thus enabling higher ratings to be carried without injury to the setting.

On the steam and condensate line, whenever possible, both lines were supported on concrete piers about 5 feet from the ground the pieces being securely dowelled to solid rock in every instance, and spaced about 20 feet apart. One support, together with the roller supports to take care of expansion, is shown in the photograph Fig. 1. This photograph shows the 10 inch and 4 inch lines side by side.

Expansion bends were placed approximately 200 feet apart, and with only two exceptions where the line passed through buildings and over bridges making bends impractical, were used throughout. When impractical, sliding joints were installed. The type of bend and method of guiding are shown in Fig. 2.

Concrete Underground Tunnels

Where it was necessary to leave the regular type of support, that is, on concrete piers, five feet from the ground, steel supports and concrete underground tunnels were resorted to. Fig 3 shows the pipe rising up to clear a road and go over the roof of the newsprint mill. Fig. 4 shows the line supported on an existing structural steel railway bridge. Fig. 5 shows the tunnel so constructed in order to pass under a road and railway spur, and also to lose elevation preparatory to passing over a stream. The tunnel is quite large enough to enable a man to enter and inspect the line.

The lines are welded throughout (see Fig. 6) and tested to 500 lbs. cold water test.

The insulation was 3 inch of 85 per cent magnesium for the steam line, and 1½ inch for the condensate return line. Traps in the line discharge into the condensate return or are bypassed. The steam enters at 175 lbs. pressure and 150 deg. superheat, and just before the reducing valve at the Upper Mills, the average is 125 lbs. pressure and 85 deg. superheat.

Will Return Capital in Estimated Time

In actual practice the line functions considerably better than was estimated, and will return the capital investment well within the estimated time.

The entire contract was carried out by the Canadian District Steam Company which has the General Supply Company of Canada Ltd. as its local representatives.

The manner in which the work was expedited and the results obtained, have been most satisfactory.

Construction of the Bleachery

The construction of the bleachery involved many changes in the existing sulphite mill, and the addition of adequate pulp storage in lap form before shipping to the specialty mills, which are approximately three quarters of a mile distant.

The wet machine room skid storage for 150 tons and the shipping room are all in one building—served by a 10-ton elevator. The wet machines are on the same floor as the screens, and there are two storage floors below. The skids are all handled by an electric lift truck from the wet machines to storage and on to cars for shipment.

No Windows Installed

The structure of the building is steel, concrete and smooth-faced hollow tile walls. The general construction is as shown in Fig. 7 and 8. No windows are installed, except that glass brick panels are provided on the top floor or the Wet Machine Floor—(see Fig. 9 and 10). Pre-cast "Haydite" roofing was used throughout.

Pulp Bleaching Corp. System Used

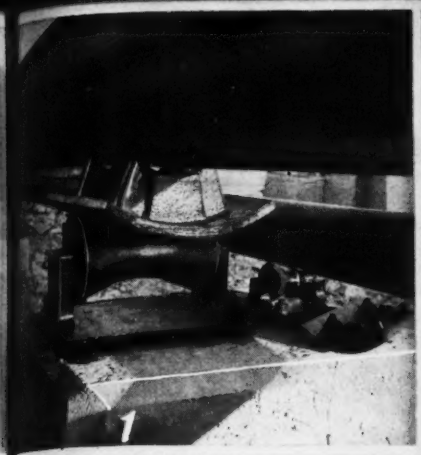
For bleaching the Pulp Bleaching Corporation system was used throughout.

All stock chests, W.W. chests and barometric seals were tile-lined. Stock lines were either rubber-lined or centrifugally cast iron. All W.W. lines are centrifugally cast iron. Washers and thickeners have all tile-lined concrete vats. Figs. 11 and 12 show the interior of two stock chests.

All stock chests are agitated by the propeller-type of agitator as supplied by the Pulp Bleaching Corporation. The bleaching equipment itself consists of one concrete tile-lined chlorinator, one steel-tile-lined caustic cooker, and two concrete tile-lined hypochlorite bleachers.

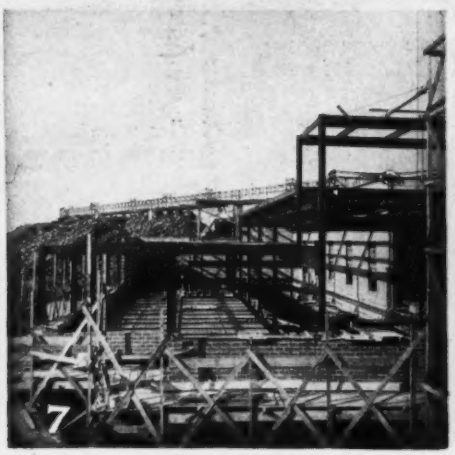
Two Washers

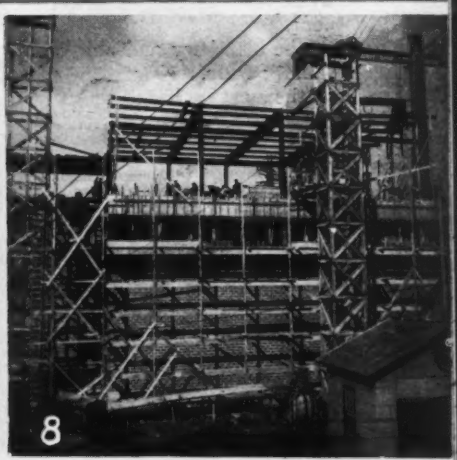
There are two washers, the interstage and the final. The interstage washer washes any pulp that has another stage to go. It discharges on to a reversible rubber conveyor belt which in turn discharges into either the caustic cooker or either one of the hypochlorite bleachers, as desired. The interstage washer is 8 feet in diameter by 6 feet face, has three press rolls; the backing, facing and winding wire is of chrome nickel steel. The final washer is of the same general construction as the interstage washer, but it

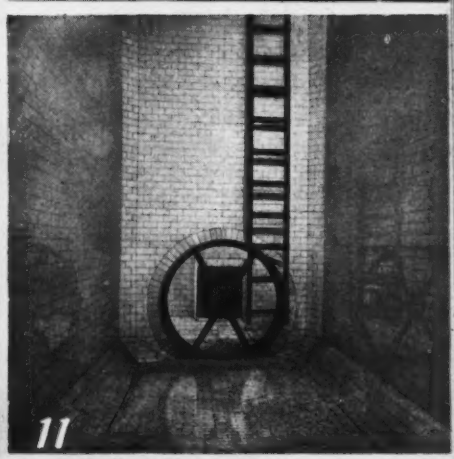


IMPROVEMENTS AT PLANT OF E. B. EDDY CO., HULL, QUE.

For description of illustration see pages 48 and 50







is smaller, i.e. 6 feet. diameter by 4 feet face, and it has no press rolls.

All controls are mounted on panels, on the operating floor of the bleachery. All valves are hydraulically-operated. One man per shift operates the bleachery.

The chlorine apparatus is indicated in Fig. 13, which also shows the chlorinator drive and inspection cabinet with part of the chlorinator control panel.

Fig. 14 shows the interstage washer and control panel. The final washer and control panel is shown in Fig. 15. Fig. 16 shows the hypochlorite bleacher drive, control panel and inspection cabinet with the conveyor belt in the background. Fig. 17 is a close-up of the interstage washer control panel, showing the stock and W.W. chest level indicators, pump and valve controls, and pressure controls on the pneumatic cylinders on the washer press rolls.

Adjustable Bleachery

The bleachery is so designed that it will act as a two-stage, three-stage or four-stage bleachery by simply manipulating the valves from the top or operating floor. Fig. 18 shows the three pipes delivering after the different stages to the interstage washer. The final washer always takes the last stage *only*. Some idea of the piping involved by having this amount of flexibility can be obtained from Fig. 19.

The fully-bleached stock is all lapped on a combination Oliver thickener and Rogers press and cutter, as indicated in Fig. 20. This machine delivers 50 tons per day at about 40 per cent A.D., and would do better if it were required to do so.

Fig. 21 shows the old standard type of wet machine used for unbleached only; Fig. 22 shows the electric truck for handling skids on the intermediate storage floor.

The bleachery and pulp storage are operating very satisfactorily, now that the minor difficulties attendant on the start-up have been overcome.

Midwest-Air Filters and Heaters

Ventilation is obtained by drawing all the air required to change the air in the rooms once every seven minutes through Midwest Air Filters and heaters. The pressure thus built-up forces any air out, rather than in, when the doors, etc., are opened, and under normal circumstances, the air escapes through the outlets provided.

Oxford Continues Modernization Program

During the year 1938, the Oxford Paper Company continued the modernization program on the paper machines with the object of improved quality and economy of costs in the manufacture of a wide variety of papers.

In addition to the work at the mills, an installation was made of a mercury amalgam electrolytic cell for one of the chemical industries. The cell is known as the Sorensen cell and has been in use in the operation at Rumford for years. This plant is located in New York City and was started making sodium hypochlorite in May 1938 and is giving very satisfactory operation. This type of cell seems to be becoming increasingly interesting to various paper companies and chemical industries.

In the paper mill the major work was concentrated on two paper machines. On one machine a new variable speed steam turbine drive, screens, new Fourdrinier, suction press rolls, additional driers, condensate system, winder and auxiliary equipment were installed.

On another machine the work carried out was not quite so extensive but involved extra hydrating equipment in the form of machine jordans, improvements to the fourdrinier, suction press rolls and modernized winding equipment including the use of constant tension devices. In addition to the major items mentioned for this machine, the necessary auxiliary changes were made in order to balance up the machine for improved uniformity of product and more economic production.

In the rewinding department additional modernized rewinding equipment was installed including constant tension devices with the object of delivering rolls which would operate to the best advantage in high speed printing operations.

The ever constant demand for supplying paper suitable for various press room conditions was the subject of a careful study during the past year and resulted in the establishment of operations which permit the regulation of the moisture in the paper shipped to suit the conditions prevailing during the printing operations. This work has involved a considerable amount of study of each step in the process from the paper machines through to the conditions surrounding the paper before it is wrapped for shipment. Constant moisture testing and control of the operating conditions at each step in the process have enabled us to meet customer requirements by necessary modifications in the manufacturing operations.

In the pulp departments, improvements have been made in stock distribution with the object of reducing manufacturing costs, improved cleanliness, and improving the proportioning of stock supply to the beaters. This has involved the installation of a considerable quantity of wood lined pipe which has proved very satisfactory in operation.

In the soda mill an additional recovery furnace and boiler were installed and new boilers and furnaces were put in on two older units.

Hinde & Dauch To Build at Detroit

DETROIT, Mich., November 28, 1938 — Plans for the erection of a Detroit plant which will give employment to more than 200 persons were announced last week by Sidney Frohman, president and general manager of the Hinde & Dauch Paper Company. The plant's produce will be corrugated paper boxes.

Immediately specifications are completed construction work will begin at W. Chicago avenue and the Pennsylvania Railroad. A single-story steel and concrete building 510 feet long and 200 feet wide will be erected.

The Hinde & Dauch firm this year is celebrating the fiftieth anniversary of its founding. Its present plants are in Baltimore, Boston, Buffalo, Chicago, Cleveland, Hoboken, St. Louis, Montreal, Toronto, Muncie, Ind., Gloucester, N. J., and Sandusky, O. Charles U. Harvey, representative of the firm here for 15 years, will be in charge of the new Detroit operations.

Necessity of extending the company's manufacturing facilities to the heart of the automotive industry has been under consideration for some time, it was explained, but expansion had been withheld because of unsettled conditions.

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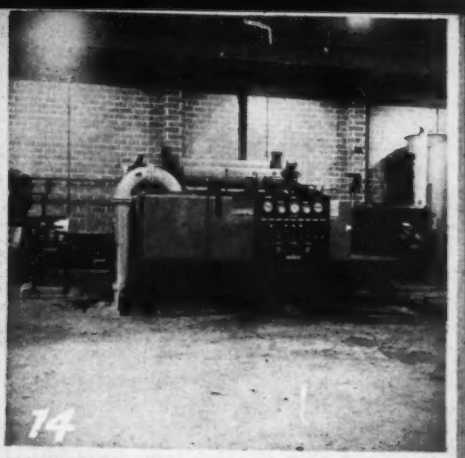
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IMPROVEMENTS AT PLANT OF E. B. EDDY CO., HULL, QUE.

For description of illustration see pages 48 and 50

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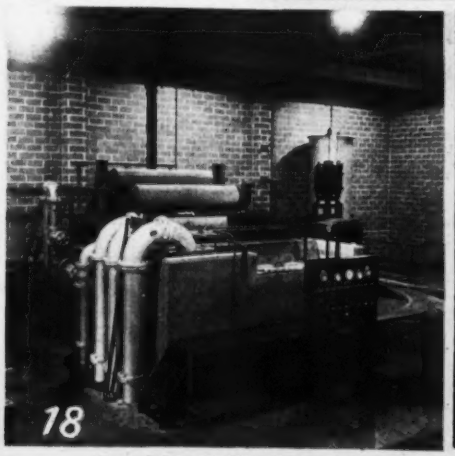
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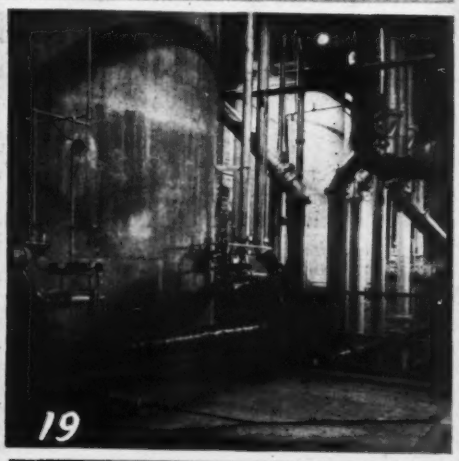
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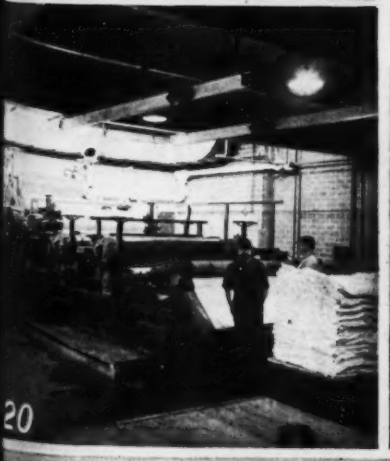
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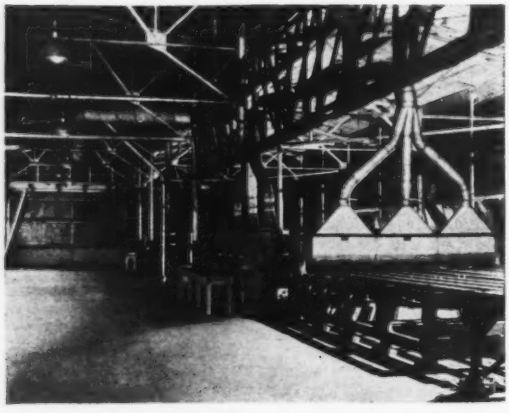
National Gypsum Co. Starts New Wallboard Mill At Mobile, Ala.

With the completion of the new fiber insulation board plant at Mobile, Ala., the National Gypsum Company has added another important item to its long line of building materials under its famous "Gold Bond" label. The completion of this project adds another major plant to the large number recently built in the south, which territory is rapidly becoming popular with northern industries.

The new plant is on a 32-acre site, on Mobile Bay, with complete facilities for shipping by water, rail, or truck. Located on tidewater, shipments can be made by steamer to domestic or foreign ports. The mill will also benefit from favorable rail rates to the principal inland markets. Private sidings from the Gulf, Mobile & Northern Railroad serve the property.

The plant was designed and built by the H. K. Ferguson Company, of Cleveland, Ohio, in conjunction with National's engineering and operating departments. It is one of the most modern wallboard mills in the country today. With the assistance of the National Gypsum Company's engineering and operating departments, a careful study of all phases of the plant operation was made before the plant was laid out, to insure the best manufacturing practice.



DOUBLE TRIMMER FABRICATING MACHINERY

BOARD DRIER.

All of the equipment installed is of the most improved type available. A modern conveyor system for handling wood out of the yard storage was erected, with a specially designed unloading device for unloading the logs from barges. Provision has been made for future expansion for the insulation board unit.

Advantageous Site Selected

The selection of the site is advantageous from the standpoint of raw material supply, low manufacturing costs, and distribution facilities. To insure an adequate supply of raw material, the National Gypsum Company has under option a considerable acreage of timber land in Alabama and Mississippi. The basic raw material used is Southern pine and Southern hardwoods.

Straight Line Production

Straight line production was the main objective in the layout of the plant. From the time the raw material arrives at the property, there is a continuous straight line movement to the finished product, ready for shipment. The logs are received in 4-foot lengths, by rail, barge or truck, and are unloaded directly on to a 1200 foot chain conveyor. This conveyor

EXTERIOR VIEW SHOWING PLANT, CONVEYOR SYSTEM, AND YARD STORAGE.

travels at the rate of 100 feet per minute, and carries the logs to the second floor of the mill, discharging them directly to the slasher saws. Here they are sized into 2-foot lengths.

Largest Unit To Handle Wood Fiberboard

By gravity, the logs drop into a barking drum for cleaning, and automatically discharge into a soaking pool. From the soaking pool they are measured and racked, and conveyed by overhead crane to the grinders, where they are converted into pulp stock. The pulp is then refined and pumped into storage tanks, from where it goes to the forming machine and is made into the mat, and then fed automatically through the press rolls. The wet sheet is next conveyed through one of the latest type gas-fired driers, utilizing approximately 1,000,000 cubic feet of gas daily. This unit is one of the largest built to handle wood fiberboard.

The board passes through the drier in continuous travel, and discharges from the dry end to the fabricating department.

Specially Designed Machines

The fabricating department consists of various intricate and specially designed machines for producing the numerous shapes, sizes, and thicknesses of wallboard, ceiling and wall tile, and insulating board, which are in demand by insulation fiberboard consumers today.

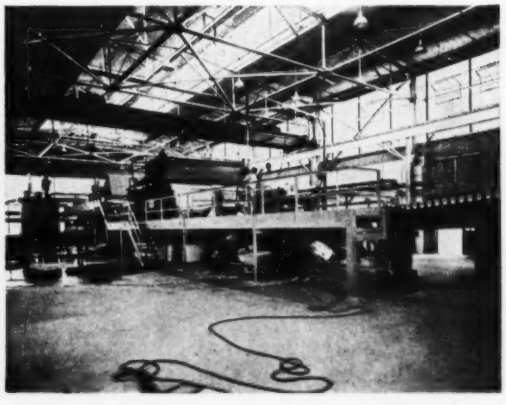
The buildings are of steel frame construction, with ample light and ventilation facilities. The floors are concrete, and the sidewalls of corrugated asbestos and steel sash. All roofs are covered with insulation board to make for cooler working conditions during the summer. Modern wash rooms and locker facilities were installed.

In addition to production floor space, there is a boiler house, modern machine shop, control laboratory, and switchboard room. An office building, one story, of brick construction, and fully air conditioned, is located close to the plant.

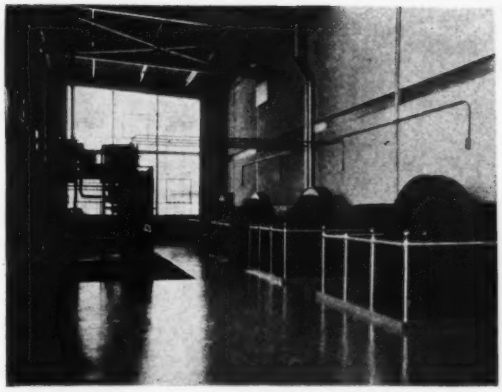
Power is supplied by the Alabama Power Company, over a newly installed power supply line to the plant. All drying and steam requirements are furnished by natural gas from the local gas company.

A fresh water supply of 1500 gallons per minute is available from wells which were drilled on the property. A connection to the city water supply is also provided for emergency use.

The National Gypsum Company is one of the leading manufacturers of improved building materials in the country. The company early established a policy that no product was to be manufactured, and no new product added, that did not represent either an improvement in the existing material, or a product for new uses. To carry out this policy a large research organization is maintained, with well equipped laboratories at its several plants. Through this technical staff, new and improved products are constantly being added to the line. With the intensive study which will be carried on by Jere Massey, manager of the Mobile Plant, and George Pecaro, assistant manager, it is expected that this plant will develop many new products. Over 130 materials of basic importance to building and other industries are already being manufactured and distributed under the "Gold Bond" label.



FORMING MACHINE AND PRESS ROLL SECTION.



MOTOR ROOM—700 HP. SYNCHRONOUS MOTORS.

Melvin H. Baker, Secretary

The company's main office is located at Buffalo, N. Y. Melvin H. Baker is president and G. H. Tarbell is vice president in charge of operations. F. A. Manske is production manager.

Air Filter Research at Mellon Institute

Dr. Edward R. Weidlein, director, Mellon Institute, Pittsburgh, has announced the establishment of an industrial fellowship in that institution by the American Air Filter Company, Inc., of Louisville, Ky. This fellowship will investigate broadly materials of value in the construction of filters for air-conditioning systems. It will be the aim to gain through this research new knowledge to effect all possible improvements in the devices manufactured by the donor, and in this work the fellowship will have the direct cooperation of specialists on the staff of the Multiple Industrial fellowship on air hygiene in operation in the institute.

Dr. Frank F. Rupert, who has been appointed to the incumbency of the Fellowship, has been a member of Mellon Institute since 1913. He received his professional education at the University of Kansas (A.B., 1906; A.M., 1908) and at the Massachusetts Institute of Technology (Ph.D., 1912). He served as instructor in chemistry at the Uuiversity of Kansas previous to 1912 and during the period 1912-1913 was junior physical chemist in the U. S. Bureau of Mines. Since 1935 Dr. Rupert has been associated with the Fellowship on air hygiene in Mellon Institute.

Northern Paper Mills, Green Bay, Wis. Builds New 5,000 K. W. Steam Power Plant

The electrical power requirements of Northern Paper Mills were furnished in the past by a hydro-electric plant owned and operated by the Northern Paper Mills, while steam was supplied by a stoker fired boiler plant approximately twenty-five years old. Steam was generated at 150 lbs. pressure. The annual fuel consumption of the old steam plant approximated 43,000 tons of West Virginia coal delivered to the mill by boat.

A study of steam and power requirements of the paper mill revealed that all electrical power could be generated as by-product of the steam necessary in the mill for the production of the paper products, without increase in annual fuel consumption and by generating the steam at higher pressure so that the hydro-electric plant could be entirely disposed of.

The existing low-pressure steam plant was considered obsolete because of the inefficiency and age of boilers and fuel burning equipment. The low steam generating pressure would not lend itself to economical power generation.

New Boiler and Fuel Burning Equipment

The steam generating units selected were two (2) Riley, type "RP" steam generating units, fired by pulverized coal. Each unit has a capacity of 75,000 lbs. of steam per hour at 675 lbs. pressure and 700° F. temperature at the superheater outlet. (Fig. 1) The furnaces are designed to permit burning of poor grades of Western coals as well as the better grades of Eastern coal. A wide variety of mines is therefore available from which coal can be purchased.

The furnaces are completely water-cooled with closely spaced bare water wall tubes. Horizontal water-cooled furnace floors are used from which ashes are removed in dry granular form by air lancing. Each steam generating unit is equipped with a tubular airheater in which the combustion air furnished to burners and pulverizers is being heated to approximately 400 degs. F. The 51-inch diameter steam-water drum of each unit is equipped with a steam washer so that clean, dry steam is supplied to superheater and turbines.

To one of the two units a Hofft refuse burning furnace is attached for the disposal of approximately 6,000 pounds of bark per hour containing up to 66 per cent of moisture.

The mechanical draft equipment consists of forced and induced draft fans mounted on a common shaft and driven by a 150 hp. high speed motor for maximum capacity and a 75 hp. low speed motor for low load operation.

When high volatile West Virginia coal is being burned the overall steam generating efficiency of the units is between 84 per cent and 84.5 per cent.

Each unit is equipped with two (2) Riley Atrita pulverizers and two flare type pulverized coal burners. With only one pulverizer and burner in service the steam generating unit will produce up to 45,000 lbs. of steam per hour.

Electrical Generating Equipment

The decision on the size of generator units was somewhat influenced by the fact that a 2,000 K. W. generator was available in the old plant which under special conditions was operated with 150 lb. pressure steam. This machine was rebuilt by substituting a new 2,000 K. W. back pressure turbine in place of the old condensing turbine. The new turbine will operate with 650 lbs. throttle pressure and with 5 lbs. to 35 lbs. gauge back pressure. A new 3,000 K. W. extracting condensing turbo-generator was installed so that a total capacity of 5,000 K. W. is available. Both turbines are designed for automatic extraction at 150 lbs. pressure with the extraction openings tied in with the old steam plant. The condenser previously used with the 2,000 K. W. generator was re-tubed and is now placed under the new 3,000 K. W. unit.

Fig. 2 shows a simplified steam-flow and feed water flow diagram of the new power plant.

The steam generating equipment, fans, pulverizers and the turbine generator units are housed in a

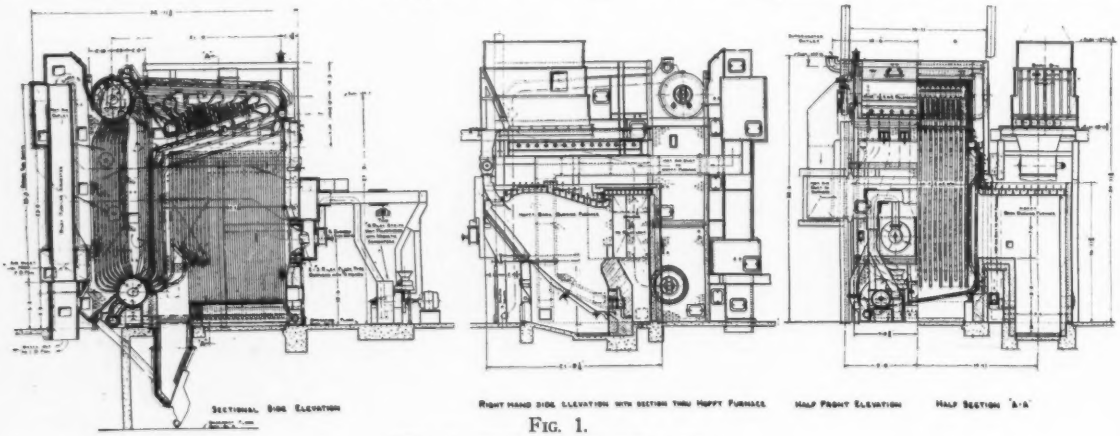


FIG. 1.
Riley type "RP" steam generating units.

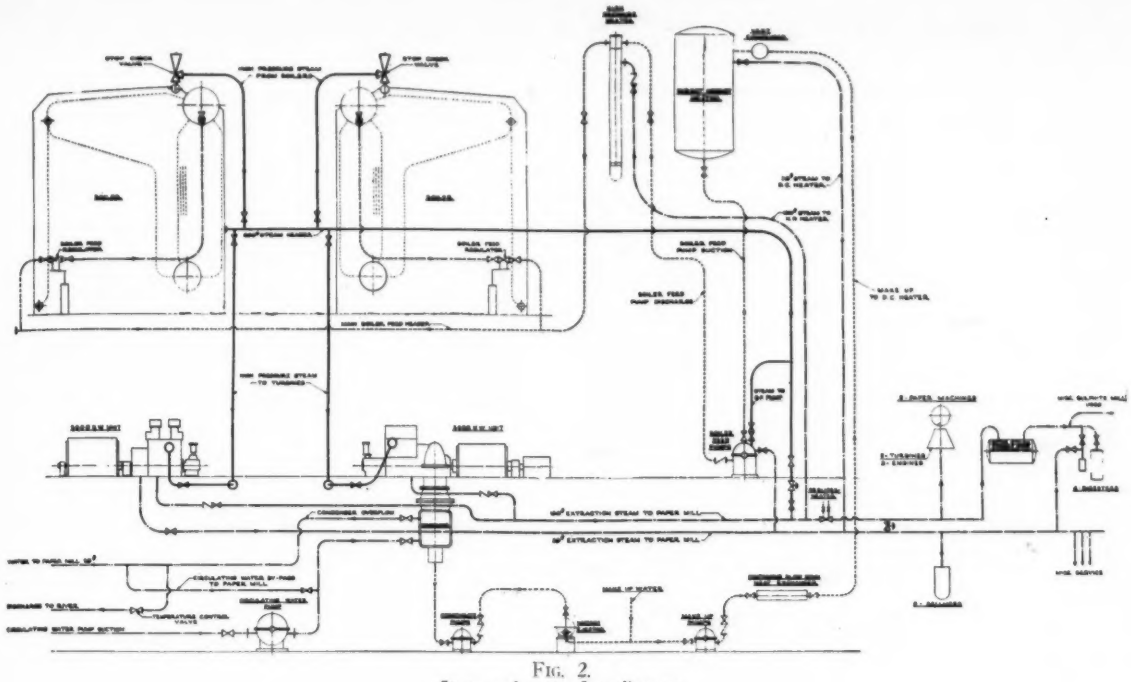


FIG. 2.
Steam and water flow diagram.

common building with no partition between turbine room and boiler room. Tight, steel-encased settings of the steam generating units and completely sealed coal handling equipment make it possible to maintain a clean boiler and turbine room, and by placing steam generating equipment and power generating equipment in a common building the personnel required for the operation of the equipment is reduced to a minimum.

Fig. 3 illustrates the arrangement of the equipment installed in the new power plant and Fig. 4 shows the building under construction. It gives an idea of the simple, pleasing lines of architecture accomplished with low cost, economical design.

Site for New Power Plant

The most convenient and suitable location for the new power plant was the site occupied by one of Northern Paper Mills' office buildings. The obstacle was overcome by the decision to move the office building to a new location. The building is 40 by 68-1/2 feet, two stories high, with a tile roof. It is of concrete and brick construction. It was necessary to move this building intact and without the dis-

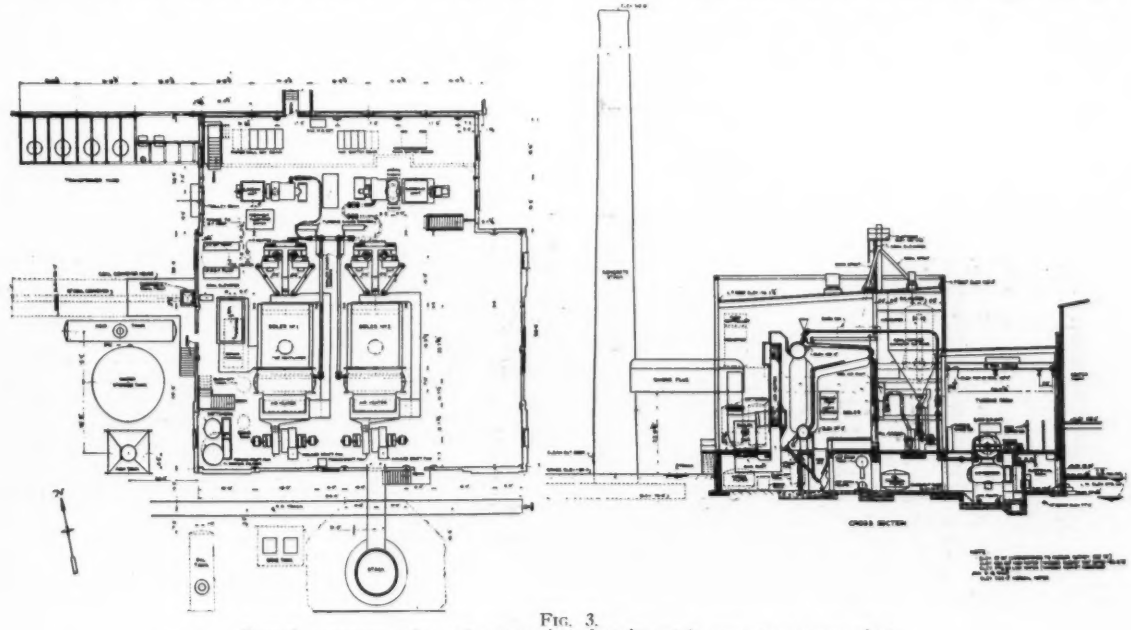


FIG. 3.
General arrangement plan and cross-section of equipment in new steam power plant.

ruption of the office work over a distance of approximately 800 feet, requiring in addition, three turns.

New foundations and basement were prepared at the new site to receive the building. The foundation walls terminated approximately 6 inches above the ground and the building was placed over the foundations, jacked up to the correct elevation and concrete piers poured between the timbers to receive the load. The actual moving of the building started on February 7 and the building was resting on its new foundations on March 3. Only eighteen actual working days were required to transport the building over the 800 feet distance.

Fig. 5 shows the office building in transit. During the entire time of moving, light, heat and telephone service were maintained by the use of cable and hose connections and the office routine was in no way disturbed. The entire moving caused no damage to brick, concrete or plaster of the building structure.

List of Principle Equipment and Contractors of New Power Plant Northern Paper Mills, Green Bay, Wisconsin

CONSULTING ENGINEER.

Sargent & Lundy, Inc., 140 South Dearborn Street, Chicago, Ill.

FUEL HANDLING.

Main conveyor to station from present track hopper—18 inch belt. Capacity 40 tons/hr.—Robins Conveying Belt Company.
Belt Weightometer—Merrick Scale Manufacturing Company.
Bark storage bin and conveyor to coal conveyor—Robins Conveying Belt Company.
Bark hogger for reducing refuse wood for burning—Capacity 6 tons/hr.—Williams Patent Crusher and Pulverizer Company.
Coal pulverizers, Riley (2) No. 4B Atrita units, table feeders, and magnetic separators—Capacity 4500 lbs./hr. each—Riley Stoker Corporation.

BOILERS AND AUXILIARIES.

Two boilers, bent tube, two drum type—operating pressure 675 lbs. at superheater outlet. Heating surface; boiler 7000 square feet, water walls 2,071 square feet. Furnace volume 3,850 cubic feet. Superheater for 700 degs. F. total temperature. Air preheaters 6,300 square feet heating surface—Riley Stoker Corporation.
Bark burning furnace—Capacity 6000 lb. of bark an hour—.66 per cent moisture—the M. A. Hofft Company.
Bark feeding equipment—the M. A. Hofft Company.
Safety valves—Consolidated Ashcroft-Hancock Company.
Blow-off valves—The Edward Valve and Manufacturing Company.
Soot blowers—Diamond Power Specialty Corporation.
Water Columns—Reliance Company.
Boiler Feed Water Regulators—Republic Flow Meters Company.

TURBINES AND AUXILIARIES.

One Turbine Generator—3000 Kw. @ .80 P.F.—3600 R.P.M. Turbine 12 stage condensing with 150 lbs. controlled extraction. Generator 3 phase—60 cycle—480 volts with direct connected 125 volt exciter.—General Electric Company.
Generator Air Cooler. 1 section 2340 square feet surface, 9000 cubic feet min., Temperature outlet air 104 degs. F. 150 G.P.M. Cooling water at 90 degs. F.—General Electric Company.
One Turbine Generator—2000 Kw. @ .80 P.F.—3600 R.P.M. Turbine 8 stage non-condensing—30 lbs. B.P. Generator from old plant adapted to new turbine. 3 phase—60 cycle—480 volts with direct connected 125 volt exciter—General Electric Company.

FIG. 4.
New power plant building under construction.

FIG. 5.
Two story office building in transit.

Generator Air Cooler, 1 section 2090 square feet surface 7000 cubic feet min., temperature outlet air 104 degs. F.—120 G.P.M. Cooling water at 90 deg. F.—General Electric Company.
Condenser—Present condenser for 2000-Kw. unit moved under new 3000-Kw. turbine and modernized—2570 square feet surface—¾-inch O.D. tubes—steam condensed 33,000 lbs./hr. 5000 G.P.M. water—Foster Wheeler Corporation.

DRAFT SYSTEM

Draft fans—1 set each boiler consisting—1 forced draft unit maximum 27,000 C.F.M. at 8.7 inches S.P. and 1 induced draft unit maximum 48,000 C.F.M. at 8 inches S.P. on common shaft. 150-Hp. high speed motor one end and 75-Hp. motor low speed opposite end.—Buffalo Forge Company.

ASH DISPOSAL.

Ash conveyed by pneumatic conveyor to outside storage tank and removed from tank by truck—United Conveyor Corporation.

FEED WATER EQUIPMENT.

Deaerating heater—1 open direct contact type—maximum capacity 200,000 lbs./hr. Water outlet temperature 275 degs. F.—The Hoppes Manufacturing Company.
High Pressure heater, 1 closed vertical heater—maximum capacity 200,000 lbs./hr. Water outlet temperature 340 degs. F.—American Locomotive Company.
Feed water treatment, one filter—capacity 200 G.P.M. for raw river water—Anthrafilt filtering element. One Hydrogen and one sodium zeolite softening units combined capacity 28,000 gallons in 7 hours—The Permutit Company.
Oil filter—One filter for removing oil from condensate returns from mill—Capacity 120 G.P.M.—The Permutit Company.
Blow-down heat exchanger. Three coils containing 150 square feet surface. Maximum capacity 75,000 lbs./hr.—The Whitlock Coil Pipe Company.

PUMPS.

Boiler feed pumps—1 steam-driven with 270-Hp. Moore single stage turbine—3600 R.P.M.—1 motor-driven with 300-Hp. 3600 R.P.M. motor—Capacity each pump 400 G.P.M. at 800 lbs. discharge head—Worthington Pump and Machinery Corporation.
Circulating water pump—1 motor-driven with 100-Hp., 1170 R.P.M. motor—Capacity 5000 G.P.M. total dynamic head 53 feet.
Raw water pumps—2 motor-driven with 15-Hp., 3500 R.P.M.—Capacity 250 G.P.M. 125 ft. total dynamic head—Dayton-Dowd Company.
Hot drain pumps—2 motor-driven with 15-Hp. 1750 R.P.M. motors—Capacity 200 G.P.M. 165 ft. total dynamic head—Dayton-Dowd Company.
Make-up pumps—2 motor-driven with 15-Hp. 3500 R.P.M. motors—Capacity 200 G.P.M. 165 ft. total dynamic head—Dayton-Dowd Company.
Bilge pumps—2 motor-driven—Capacity 200 G.P.M. 30 ft. total head. One installed-turbine room basement, one installed in coal handling system outside building—Yoeman Brothers Company.
Acid pumps—2 motor-driven with 2-Hp. 1750 R.P.M. motors—Capacity 50 G.P.M. 48 ft. total dynamic head.—Worthington Pump and Machinery Corporation.
Brine Pumps—2 motor-driven with 3-Hp. 1750 R.P.M. motors—Capacity 30 G.P.M. 55 ft. total dynamic head.—Worthington Pump and Machinery Corporation.

TANKS.

Treated water storage—Manitowoc Engineering Works.
Boiler blow-down—Manitowoc Engineering Works.
Drain returns from mill—Manitowoc Engineering Works.

DESUPERHEATER AND REDUCING VALVE.

One—4 inch reducing valve—Capacity 100,000 lbs./hr.—Republic Flow Meter Company.
One—Desuperheater to reduce above steam from 700 degs. to 450 degs. F.—Republic Flow Meters Company.

TURBINE OILING SYSTEM.

One—1500 gallon 2 compartment tank, one side for clean oil, one side for dirty oil.
One—Pressure filter—Capacity 5 G.P.M.
One—Filter pump 5 G.P.M.—driven by ½-Hp. 1140 R.P.M. motor.
One Transfer Pump—18 G.P.M. driven by 1-Hp. 1135 R.P.M. motor.

PIPING VALVES & FITTINGS.

High-pressure valves—Crane Company.
Blow-off valves—The Edwards Valve and Manufacturing Company.
Turbine relief valves—Atwood & Morrill.
Float valves—Fisher Company.
Piping—Crane Company.
Flexible steel ext. Joints—Badger Company.
Piping System—William A. Pope Company.

CONTROLS AND INSTRUMENTS.

Combustion control equipment—Republic Flow Meters Company.
Boiler gauge boards—Republic Flow Meters Company.
Boiler Meters—Bailey Meter Company.
Steam flow meters—Republic Flow Meters Company.
Water flow meter—Builders Iron Foundry.
Recording thermometers—Bristol & Republic.

TURBINE ROOM CRANE.

One—15 ton single motor 28½ feet span—floor operated crane—The Cleveland Crane and Engineering Company.

MISCELLANEOUS STEEL & IRON.

David Architectural Iron Works.

ELECTRICAL.

Main control switchboard—General Electric Company.
Large 440 volt. Gen. & Feeder Circuit Breakers—General Electric Company.
Paper Mill Feeder Switchboard—General Electric Company.
Station Auxiliary Switchboard—General Electric Company.
440 volt motor controls—I.T.E. Air Breaker Company, General Electric Company.
Station Control Battery—Electric Storage Battery Company.
Power Transformers—Electric Service Company.
Lighting Transformers—Westinghouse Electric Manufacturing Company.

New Potdevin Web Register Device

Potdevin Machine Company, of Brooklyn, N. Y., has announced the development of a new web register device (patent applied for) to control paper weave in paper roll converting equipment. This unit is especially adapted to machinery converting pre-printed paper, badly wound rolls, or when slitting, punching, die-cutting, etc.

Several inherent advantages are gained by use of this automatic register device. It can be used with all types of web work whether a sensitive adjustment is necessary or only an approximation, since its sensitivity is controlled by simple mechanical means. The operation of this unit is not dependent on the type or color paper. Its initial cost and the cost of operation is less because its sensitivity is dependent on the shutter apparatus and not the photo-electric cell which, therefore, need not be of a very sensitive design or construction. The controlling units are totally enclosed. As a result not only do the light sources and apertures remain clean so that no trouble is experienced with differences in light intensity due to dirt accumulating in the light unit, but the necessity of cleaning or readjusting the photo-electric cells for changes in light intensity from daylight or room illumination is eliminated.

The operation of this unit depends upon the edge of the web to be controlled. A mechanical follower contacts the edge of the web of paper. The follower operates a shutter which when in normal position intercepts light rays by covering two small apertures.

When the web moves out of normal position, the follower also moves. The shutter uncovers one of the apertures letting the light rays pass through which activates one of two photo-electric cells.

This, in turn, energizes one of two electro magnets which operate a compensating arrangement connected with the mill-roll shaft on the machine. Thus, when the web weaves a little to one side this web control unit goes into action causing the entire mill-roll to be moved in the correct lateral direction.

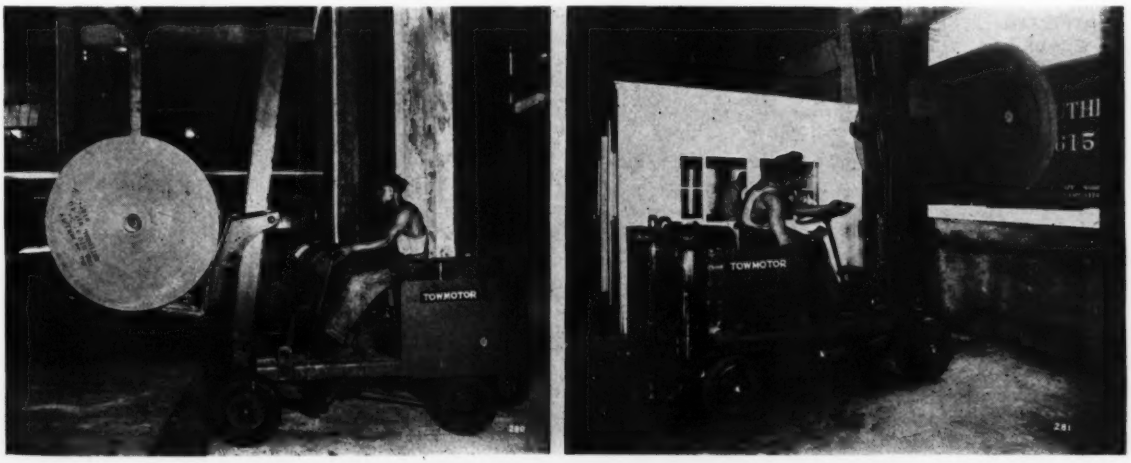
Since the only work required of the follower is to intercept light rays, it is made of very light construction, but by means of a special device vibration caused by rough paper edges is eliminated.

This method of web control, according to the manufacturers, is far superior to web controlling devices wherein the light rays are intercepted by the web being controlled.

Towmotor Trucks At National Container Mill

Towmotor lift trucks have been installed at the new kraft plant of the National Container Corporation at Jacksonville, Fla.

In the two views of the Towmotor lift trucks presented herewith, one shows the lift truck taking rolls from the finishing machine to storage, while the other shows a Towmotor lift truck putting the rolls of paper through an opening in the wall on a ramp that leads to the box cars. The Towmotor model "L" lift truck with special lifting carriage for roll handling, which is represented in the illustrations, has a capacity of three tons, lifts 90 inches, is straight gasoline powered and speeds up to 8 m.p.h. This truck conveys rolls of kraft paper from finishing end of machine to storage, stacks and unstacks in storage and conveys to shipping platform.



TOWMOTOR TRUCKS IN OPERATION AT MILL OF NATIONAL CONTAINER CORP.

GENERAL VIEW, QUEBEC NORTH SHORE PAPER CO., BAIE COMEAU, P. Q.

Great New Plant at Baie Comeau Is Latest Word in Newsprint Manufacture

The great new mill of the Quebec North Shore Paper Company, at Baie Comeau, Quebec, which is the latest development in the Canadian newsprint industry is located four hundred miles below Montreal on the north shore of the Gulf of St. Lawrence. At this point the Gulf is thirty-five miles wide and the nearest rail point is Rimouski, which is somewhat up the river and fifty-five miles distant by water.

The development includes everything necessary to convert a rugged rock bound forest expanse such as existed here previous to 1936, into a complete operating industrial community.

A wharf adequate to accommodate ocean going vessels, a railway for handling heavy shipments, roads, a complete town including two hotels, a bank, stores, churches, schools, administrative buildings, amusement centers, light, telephone, water and sewer services; all these have been provided to complete a community with practically every modern convenience. A Hydro-Electric power development on the nearby Outardes River, with transmission lines to the mill and townsite gives a power and light supply comparable with metropolitan centers. The mill, designed solely for the production of newsprint, is of the most modern type, with two large paper machines at present and provisions for future expansion.

The Ontario Paper Company, whose mill is located at Thorold, Ont., was incorporated in 1912 to produce newsprint for the use of the Chicago *Tribune* and the latter's wholly owned affiliates. The requirements of this paper and the New York *Daily News*, which was started in 1919, have increased to such an extent as to require the purchase of large quantities of newsprint from other sources, but the company has steadily increased its own capacity to produce and handle these requirements. The completion of the development at Baie Comeau marks the latest step in following this policy of independence and its production will be used almost entirely by the New York *News*.

To supply the wood for this new mill, the company has under lease, 2,553 square miles of limits. The major parts of these limits are located on the Manicouagan River and its northeast branch, the Toulnoustook, with other blocks on the adjoining smaller rivers. It is estimated that these areas will provide a continuous wood supply for the mill at its present capacity and be capable of providing for further expansion should this be undertaken.

These timber limits and the essential water power rights were acquired in 1923 on the understanding with the Provincial Government that certain developments would be carried out. Engineering surveys were made and dams, wharves, river improvements, etc., were built, during the years 1923 to 1929 at a total cost of over $5,000,000.

In 1930, the company was prepared to proceed with the construction of a mill, but in accordance with the wishes of the industry generally, and with the approval of the Provincial Government, the development was postponed in view of the world wide depression, and the uncertain outlook of the newsprint industry. Finally in 1934, the Government asked the company to proceed. This time the directors looking at the long range prospects of their own consumption decided that the building of a newsprint mill was desirable rather than a pulp mill only, and the completion of the work began in earnest. Construction work was resumed in the spring of 1936 and the mill turned out its first paper in January 1938.

The isolation and lack of communication, except by water, were the principle objects to be overcome in the execution of this development. The transportation and expediting of the thousands of tons to the site was a phase of the work which demanded the most exacting direction and supervision.

The design of the mill, the power plant and the town was carried out with the full knowledge that there must be no serious mistakes, but that on

the other hand no worthwhile progress in the art of paper making, power producing or town planning could be made without incurring the risk of disappointments. The designs were made as progressive as they could be without undue risk to the capital invested.

Arthur A. Schmon, President and Gen. Mgr.

Arthur A. Schmon, who has been president and general manager since 1930, started his career with the company in 1919 as manager of the first plant in operation on the North Shore of the Gulf of St. Lawrence. He subsequently became woodlands manager and under his direction the surveys and field engineering of the Baie Comeau development were made. All phases of the project, including the planning, designing, construction and purchasing of equipment have been under his active direction. Consultants in specialized fields were engaged to give the benefit of their knowledge and advice—John Stadler on mill layouts and mill design, H. G. Acres & Co. on power development, L. F. Schlemm on townsite planning and T. A. McDonald on personnel. In the execution of the details of all this planning, estimating, comparing and studying, Mr. Schmon was ably assisted by R. W. Shaver, manager of construction, D. W. Ambridge, assistant to the president; E. B. McGraw, manager of woodlands; Lorne C. Anderson, manager of the Thorold Mill, Jules T. Jaeger, chief engineer and M. H. Jones, assistant chief engineer.

Since it was desirable that the administration of the development have ready access to the general policies and methods of management, and at the same time take full advantage of the knowledge and experience of the company's operating personnel, it was decided to carry out the engineering design and purchase of equipment at Thorold. Purchasing of construction materials was carried out at the company's Montreal office where the purchasing department for the woodlands operations and the company's transportation offices were located.

The general contract for construction of the development and erection of machinery was awarded to the Foundation Company of Canada Ltd. and through this organization sub-contracts were arranged on specialized work, wherever it seemed advisable. In cases where equipment was purchased erected, the general contractor cooperated with the equipment manufacturer. The company already had an experienced and capable woods-construction organization, the woods department therefore was made responsible for the construction of roads, logging flumes, river improvements and other woods development construction.

In planning the construction, every opportunity was taken of avoiding duplication. A hotel and a large number of permanent homes, the paper storage shed, machine shop, mill stores and offices, permanent roads, wharf and unloading facilities were erected first and made ready to facilitate the final stages of construction.

Objectives Clearly Defined

The objectives to be met by the engineers in the design of the mill were clearly defined. It was necessary to meet the very high quality requirements of the New York *News*. It had to be designed so that it could be navigated successfully in all sorts of economic weather, in other words, it had to be a low cost producer of high quality newsprint, and the capital cost had to be kept within well defined economic limits.

Much thought was given to the question of width of machine, and the trend towards high operating speeds and the use of low sulphite percentages was appreciated. The decision was made to install comparatively wide machines designed for operation at high speed with a low sulphite pulp content. This required that the machines be built with greater weight and strength than usual; that greater water removal capacity and more uniform ventilation be provided. In order to prevent excessive unit weights at the calender stacks, the machines are equipped with the largest diameter bottom calender rolls which have ever been made. These rolls are 40 inches in diameter and weigh 50 tons each. All the other rolls in the stack are hollow and weigh no more per inch of nip than do the rolls on a stack only 232 inches wide. All bearings except the bottom bearings are anti-friction.

High Speeds With Little Sulphite

With the decision to decrease the sulphite percentage at high speeds, it became necessary to provide a very large water removal capacity in the wet ends, and to arrange for high head-box temperatures. The wet ends of the machines are therefore equipped with 100 foot wires, very large table rolls, splash guards, forming tables, pitch adjustment, double boxes in the couch rolls, eight suction boxes and unusually large vacuum pumps. It is anticipated that these special features, together with high head box temperatures will make it possible to operate at very high speeds with very little sulphite, and will materially contribute to the eventual solution of the problem of good quality at these high speeds.

Economy of operation is of course closely bound up with machine room efficiencies. One of the most common reasons for low efficiencies is slime. Apart from the trouble which slime causes in the mill, it is also the source of innumerable breaks in the press rooms. Every effort was made to deal effectively with this problem, and as a result, the mill is equipped with copper lined head boxes, copper chutes and troughs, all piping carrying stock is made of an asbestos cement composition known as transite, and much of the small size water piping is streamlined copper. Fittings are rubber lined, and only the valves in stock lines are of iron. These precautions are further backed up by a completely closed white water system which permits the use of very high temperatures in the stock system. High temperatures have been found to have an inhibiting effect on slime growths, and to date the mill is practically slime free.

The Ground Wood Mill

The ground wood mill is designed with high quality ground wood as the main objective. The hydraulic magazine grinders run at rather slower speeds than usual. The motors driving them are somewhat higher powered. The thickeners are provided with double valves so that the clear filtrate is kept separate for use in showers. A refining system has been installed to recover the fine screen rejects so that the only waste from the system is the large slivers rejected by the coarse screens.

The twelve hydraulic type magazine grinders were built by Waterous Limited. They are arranged in pairs with a 3500 h.p. General Electric motor in the

center driving the two 54 inch face stones at 212 r.p.m. The grinders are charged from the floor above, where a 12 hour supply can be stored.

The coarse screenings are removed by three Pascol screens which were supplied by the Port Arthur Ship Building Company. The 42 inch centrifugal fine screens were supplied by Waterous Ltd. From these the accepted stock goes to six Oliver Filters to be thickened and the rejects are taken to two re-screens of the same type. The rejects from these, in turn, enter the Noble & Wood refining system.

Sulphite Mill

This department plays a smaller part at Baie Comeau than in most other mills. The outstanding unusual feature is the very sharp bottom cone of the digesters, which is intended to reduce difficulties in blowing the digesters and provide a more uniform pulp. A surprisingly low steam and sulphur consumption has resulted.

The two digesters are each rated at 12½ tons per cook. They have a volume of 4850 cubic feet and they are built with bottom cones at 40 deg. instead of the conventional 70 deg. A chemipulp hot acid system is used. The digesters and the acid accumulator were erected by the Horton Steel works. In the acid plant the usual type of rotary sulphur burner with vertical spray type gas coolers and Jennssen towers are used. Knots are removed by a Pascol screen. Accepted stock from this goes over a riffler and is pumped to Waterous Centrifugal quiller fine screens. The rejects from these are rescreened by two Waterous 16 plate flat screens and the accepted stock from both the primary and the rescreens is dewatered on two 48 inch by 120 inch Woods thickeners built by Sherbrooke Machineries Ltd.

The Paper Machines

The two paper machines are designed for a basic production rate of 120,000 tons of newsprint per annum. They were built by the Dominion Engineering Company. They are right and left hand duplicates of 262 inches wire width and capable of operating up to 1500 feet per minute. The Fourdrinier section is removable and the 100 foot wire is arranged so that its pitch may be varied from 26 to 38 inches. Provision is made on each machine for fifteen—14⅛ inch rubber covered table rolls with splash deflectors, eight—8 inch suction boxes and a 27 inch dandy roll. Vacuum for the couch rolls is obtained by two—2 cylinder reciprocating type vacuum pumps 36 by 36 by 12 inches, supplied by the Canadian Ingersoll-Rand Company. Vacuum for the suction boxes and presses is obtained with Nash pumps. The press section is made up of two suction presses and a smoothing press.

The drying section of each machine has a 42 inch baby drier, forty-eight—60 inch main driers and ten —60 inch felt driers. Michell segmental shoe bearings are used on the main driers and double taper roller bearings on the felt driers. Drier drainage is effected by a Cram system and lubrication by a Bowser pressure feed system.

The machines are driven by Harland Electric drives supplied by Bepco (Canada) Ltd. The ventilation and heating system complete with hoods and Briner economizers was supplied by Ross Engineering Company of Canada.

Power Development

Power for the Baie Comeau development is developed at Outardes Falls, 14 miles southwest of the mill. The gross head available from the head pond to high tide is 222 feet, of which 208 feet is available as the normal effective head. The principal dam has a maximum height of 85 feet and is approximately 500 feet long. Two other smaller dams were necessary to close the nearby low rock contours.

Water flows from the dam to the power house through a wood stave pipe 5,950 feet long and 17 feet 6 inches in diameter. This is the largest diameter pipe of this type which has ever been built. Near the power house the water is divided in two penstocks and a surge tank is provided to control the water column. Two generator units are necessary in order to provide a spare in case of trouble. Normally, both are operated at full load and the output from the spare is used for the generation of steam. These machines were supplied by the General Electric Company and they are each rated at 26,315 K.V.A. 6600 volt, 3 phase, 60 cycle, 95 per cent power factor at 180 r.p.m. The turbines, butterfly penstock valves, penstocks and steel pipe were supplied by Canadian Allis-Chalmers, with the Woodward Governor Company having a sub-contract for the turbine governors and Canadian Vickers for the steel pipe line. The turbines will produce 32,600 h.p. under a minimum head of 193 feet or 35,300 h.p. under the normal head of 208 feet. They are vertical, single runner type with a diameter of 11 feet 2 inches at the scroll case inlet and a 24 inch shaft.

For transmission to the mill the power is stepped up to 66,000 volts. The two circuit transmission line is carried on 84 steel towers. An emergency power plant at the mill has two diesel engine driven generators of 375 K.V.A. each supplied by the English Electric Company. All larger motors are 2200 volt synchronous, which results in a very high power factor for the system.

The Steam Plant

Under normal operating conditions, the entire steam demand is met by the two General Electric steam generators which use the power from the spare unit at Outardes Falls. Two pulverized coal fired units capable of carrying the full steam load are installed for stand by service. These were supplied by Foster Wheeler Company and each is rated at 90,000 lb. per hour at 250 lb. pressure. One of these is equipped with four Hofft furnaces for burning wood refuse and it is being used to dispose of the bark, screenings and other wood refuse as it is available. Coal is stored outside and reclaimed by a drag line and belt conveyor system. Feed water is conditioned in a Cochrane deaerating and heating system. Due to the low hardness of the water, softening equipment is not necessary. A 6200 cubic foot Ruths steam accumulator provides a storage of 32,000 lb. of steam between 200 and 25 lb. pressure. This permits wide and very rapid changes in the steam supply to the paper machines, without affecting the smooth operation of the boilers.

Wood Handling

The wood comes to the mill by flume in four foot lengths during four summer months. It is barked in three 12 foot by 45 foot U-bar type barking drums supplied by Horton Steel Works. There is yard space for storing approximately 90,000 cords of barked wood. The main log feed conveyor operates in either direction and uses a 30 inch 7 ply rubber belt. Chips

for the sulphite mill are made on an 88 inch Waterous chipper. Rejected wood from the wood room is broken up in a 36 inch Waterous refuse hog. Bark from the drums has its moisture content reduced in a 6 roll bark press supplied by the Northern Foundry and Machinery Company. For wood cleaning, two Williams & Wilson wood peckers are installed. All wood refuse, including bark, hogged cull wood, sawdust from the chip screens, shavings from the wood peckers and slivers and knots from the coarse screens are conveyed to the steam plant for disposal.

Paper Handling

The finishing room space is 120 feet square. Wrapper is obtained from the Thorold mill and the finishing is carried out in two shifts. The storage shed can hold five months production. Delivery of paper can be made during summer months only. It is taken to the dock on a standard gauge railway about one mile long, where it is loaded aboard vessels for ocean shipment.

Maintenance and Construction

The difficulty of obtaining supplies during the winter season necessitated careful planning of stores, machine shop and maintenance arrangements. Many of the mill items have been standardized, such as motor sizes, pumps, belt drives, etc., to reduce the required variety of spare parts. This department includes a complete machine shop, pipe shop, welding shop, millwright and carpenter shop, blacksmith shop and electrical repair shop, all of which are particularly well equipped so that repairs and minor construction jobs can be done without recourse to outside shops.

Community Services and Activities

Employees are encouraged to build their own homes under conditions in which the investment is protected by a company guarantee. A twenty bed hospital is in operation under the direction of competent physicians and surgeons. There is a dental surgeon, with offices in the business section. Stores in operation include a general store, grocer, druggist, jeweller, tailor, barber and cobbler. There is a cold storage plant for handling meats and perishable materials. A complete banking service is available.

Two churches have been opened and two schools are in operation with highly qualified teachers. The Manoir Comeau, staff house and hotel is very comfortable and beautifully appointed. It is intended to house company officials and transients. A well equipped boarding house with forty rooms provides excellent living quarters for employees of the mill and various town services, who are not householders.

The town has complete public services such as electricity, a chlorinated water supply and a sewer system. The local telephone system connects by beam radio to Rimouski and hence to the world system. The Canadian National Telegraph system has direct wire connections. Mail enters and leaves daily by boat during summer months. During winter first class mail is carried daily by aeroplane and secondary mail is taken by boat once in two weeks.

Activities of the community are under the direction of the elected Mayor, H. A. Sewell. The mill executive staff is headed by G. J. Lane, manager, and includes R. M. Cooper, general superintendent, R. E. Hayes, control, H. B. McAdam, groundwood, P. W. Neil, sulphite; G. C. Kerr, steam plant; W. G. Reekie, plant engineer; D. Anderson, electrical engineer and R. Comette, maintenance engineer.

American Cyanamid Locates New Plant

Making an important contribution to the wave of industrialization along the line of the Seaboard Railway, the American Cyanamid and Chemical Corporation, 30 Rockefeller Plaza, N. Y. C., has purchased land and buildings for the establishment of a chemical works at Georgetown, S. C., it is announced by Warren T. White, Seaboard general industrial agent.

Situated on the Sampit River, the property, which consists of a 72-acre tract, complete with plant, has dock facilities for vessels of 30-foot draft. The land has been acquired from the Seaboard Railway and the plant, comprising large manufacturing buildings, boiler house and office building, has hitherto belonged to the Atlantic Coast Lumber Company.

According to H. L. Derby, president of the American Cyanamid and Chemical Company, construction and remodelling will begin at once and when completed will enable the Corporation to give better service to the trade in the southeastern States besides adding impetus to the substantial progress observed in that region's industries. The first unit installed will be a plant for the production of sulphate of alumina, used for water purification and in the manufacture of paper.

This new development, which illustrates the wide diversification of industry located along the line of the Seaboard Railway, is the logical result of the growth of the pulp and paper industry and connected enterprises stimulated by the Seaboard during the past three or four years. Out of 11 new plants in the southeastern States, nine are served by the Seaboard.

The American Cyanamid and Chemical Corporation, further announces that the chemical works under construction at Mobile, Ala., on land recently acquired, are nearing completion. Other Southern plants of the corporation—which also operates extensively in northern cities—include those at Valdosta, Ga., Charlotte, N. C., Chattanooga, Tenn., and plants of partially owned companies at Panama City, Fla., Brownfield, Tex., and O'Donnell, Tex. The corporation also owns bauxite mines at Andersonville, Ga., and Little Rock, Ark.

Hydrion pH Control

A new chart printed in fourteen colors issued by R. P. Cargille, 118 Liberty street, New York, shows how the Hydrion wide-range pH test paper has been extended to include a color change for each pH unit throughout the range from pH 1 to pH 14. Fourteen buffer solutions, one for each pH unit, are used to bring out on the test paper the characteristic color for any pH unit. Also new is the simple comparator plate included in each vial. This plate makes the colors more vivid and facilitates comparisons.

Hydrion test paper is used like litmus, but gives readings to well within 0.5 pH units. This extremely simple and economical method is a definite advance in pH control for analysis, product testing, and process control. Color charts will be sent without charge to those interested.

Printing Committee Announces Paper Awards

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., November 28, 1938.—Awards were announced today by the Joint Congressional Committee on Printing for paper for the use of the Government Printing Office for six months beginning January 1 next.

Awards were made on all but ten lots. Of this number no bids were received on three lots and on several lots there were ties for low bids. In these cases no awards were made but the paper will be purchased on the open market. On a couple of lots all bids were rejected with no reason assigned for the rejection. Bids for this paper were opened on November 21. Following are the awards announced today:—

No. 1, National Pulp and Paper Company, 2,425 cents (200 tons only)

No. 3, Whitaker Paper Company, 4.98 cents.

No. 4, Whitaker Paper Company, 4.98 cents.

No. 5, Whitaker Paper Company, 4.97 cents.

No. 6, Frank Parsons Paper Company, 4.455 cents.

No. 7, Frank Parsons Paper Company, 4.45 cents.

No. 8, Frank Parsons Paper Company, 4.45 cents.

No. 9, Frank Parsons Paper Company, 4.46 cents.

No. 10, Whitaker Paper Company, 4.44 cents.

No. 11, Frank Parsons Paper Company, 4.86 cents.

No. 12, Frank Parsons Paper Company, 4.61 cents.

No. 13, Perkins Goodwin Company, 4.70 cents.

No. 14, Stanford Paper Company, 9.00 cents (70 lbs.) 8.00 cents (100 lbs.)

No. 15, Perkins Goodwin Company, 4.94 cents.

No. 16, Whitaker Paper Company, 4.98 cents.

No. 17, Whitaker Paper Company, 4.68 cents.

No. 18, Old Dominion Paper Company, 5.64 cents.

No. 19, Paper Corp. of U. S., 11.78 cents.

No. 20, Aetna Paper Company, 7.778 cents.

No. 21, Aetna Paper Company, 7.778 cents.

No. 22, Aetna Paper Company, 7.628 cents.

No. 23, Aetna Paper Company, 9.748 cents.

No. 24, Lee Paper Company, 15.37 cents.

No. 25, Lee Paper Company, 15.11 cents.

No. 27, Frank Parsons Paper Company, 4.82 cents.

No. 28, Frank Parsons Paper Company, 4.89 cents.

No. 29, Frank Parsons Paper Company, 4.52 cents.

No. 30, Frank Parsons Paper Company, 4.26 cents.

No. 31, Frank Parsons Paper Company, 4.26 cents.

No. 36, Stanford Paper Company, 6.14 cents.

No. 37, Virginia Paper Company, 11.91 cents.

No. 40, Aetna Paper Company, 8.498 cents.

No. 43, Cauthorne Paper Company, 4.59 cents.

No. 44, Stanford Paper Company, 5.59 cents.

No. 47, Aetna Paper Company, 5.438 cents.

No. 51, R. P. Andrews Paper Company, 10.08 cents.

No. 52, R. P. Andrews Paper Company, 9.05 cents (white) 9.65 cents (blue).

No. 53, Stanford Paper Company, 10.93 cents.

No. 55, Perkins Goodwin Company, 4.75 cents.

No. 56, Perkins Goodwin Company, 4.60 cents.

No. 57, Paper Corp. of U. S., 5.56 cents.

No. 58, Perkins Goodwin Company, 4.25 cents.

No. 59, Perkins Goodwin Company, 4.25 cents.

No. 60, Barton, Duer & Koch Paper Company, 6.90 cents.

No. 61, Marquette Paper Company, 5.59 cents.

No. 63, Stanford Paper Company, 18.23 cents.

No. 64, R. P. Andrews Paper Company, 6.75 cents.

No. 65, Rejected.

No. 66, Rejected.

No. 67, R. P. Andrews Paper Company, 11.57 cents.

No. 69, Butler Company, 16.28 cents.

No. 70, Graham Paper Company, 6.50 cents.

No. 71, Graham Paper Company, 7.40 cents.

No. 73, Marquette Paper Company, 15.00 cents.

No. 74, Stanford Paper Company, 11.22 cents (150,000 pounds); Barton Duer & Koch Paper Company, 11.28 cents (Balance of order).

No. 75, Marquette Paper Company, 17.25 cents.

No. 76, Lee Paper Company, 12.11 cents.

No. 78, Barton, Duer & Koch Paper Company, 25.88 cents.

No. 79, Old Dominion Paper Company, 21.108 cents.

No. 83, Barton, Duer & Koch Paper Company, 14.64 cents.

No. 102, Whitaker Paper Company, 5.39 cents.

No. 109, Aetna Paper Company, 9.098 cents.

No. 110, Aetna Paper Company, 7.678 cents.

No. 111, Butler Company, 7.131 cents.

No. 112, Aetna Paper Company, 7.238 cents.

No. 113, Aetna Paper Company, 7.148 cents.

No. 114, Baxter Paper Company, 9.39 cents.

No. 115, Aetna Paper Company, 7.848 cents.

No. 116, Aetna Paper Company, 7.468 cents.

No. 117, Aetna Paper Company, 7.468 cents.

No. 120, Aetna Paper Company, 11.188 cents.

No. 121, Aetna Paper Company, 8.588 cents.

No. 122, Aetna Paper Company, 8.548 cents.

No. 123, Aetna Paper Company, 9.788 cents.

No. 125, Stanford Paper Company, 17.98 cents.

No. 126, Stanford Paper Company, 14.68 cents

No. 128, Stanford Paper Company, 18.13 cents.

No. 129, Stanford Paper Company, 18.13 cents.

No. 140, Stanford Paper Company, 21.13 cents.

No. 141, Stanford Paper Company, 18.23 cents.

No. 151, Marquette Paper Company, 5.74 cents.

No. 152, Marquette Paper Company, 5.74 cents.

No. 154, R. P. Andrews Paper Company, 7.67 cents.

No. 155, Aetna Paper Company, 8.488 cents.

No. 156, Aetna Paper Company, 8.488 cents.

No. 157, R. P. Andrews Paper Company, 8.87 cents.

No. 160, Aetna Paper Company, 8.978 cents.

No. 161, Aetna Paper Company, 8.978 cents.

No. 162, Graham Paper Company, 8.97 cents.

No. 163, Baxter Paper Company, 9.37 cents.

No. 164, Aetna Paper Company, 9.478 cents.

No. 165, Barton, Duer & Koch Paper Company, 9.70 cents.

No. 168, Barton, Duer & Koch Paper Company, 13.04 cents.
No. 169, R. P. Andrews Paper Company, 12.87 cents.
No. 170, R. P. Andrews Paper Company, 12.87 cents.
No. 171, R. P. Andrews Paper Company, 12.87 cents.
No. 172, Baxter Paper Company, 13.91 cents.
No. 173, Barton, Duer & Koch Paper Company, 13.95 cents.
No. 176, Butler Company, 17.58 cents.
No. 177, Butler Company, 17.58 cents.
No. 178, Butler Company, 17.58 cents.
No. 179, Butler Company, 17.58 cents.
No. 180, Butler Company, 17.58 cents.
No. 181, Butler Company, 17.58 cents.
No. 184, Marquette Paper Company, 5.129 cents (150,000 pounds); Barton, Duer & Koch Paper Company, 5.13 cents (remainder of order).
No. 190, Aetna Paper Company, 8.878 cents.
No. 191, Marquette Paper Company, 11.70 cents.
No. 192, Aetna Paper Company, 8.978 cents.
No. 193, Marquette Paper Company, 11.90 cents.
No. 196, Barton, Duer & Koch Paper Company, 16.85 cents.
No. 197, A. Hartung & Company, 9.61 cents.
No. 198, No bids received.
No. 201, John F. Post, Inc., 6.45 cents.
No. 202, John F. Post, Inc., 6.85 cents (India tint), 7.45 cents (light green); Stanford Paper Company, 7.71 cents (emerald green).
No. 203, Stanford Paper Company, 7.10 cents.
No. 204, Stanford Paper Company, 7.00 cents.
No. 205, Lee Paper Company, 10.37 cents.
No. 209, Old Dominion Paper Company, 3.9379 cents.
No. 210, Old Dominion Paper Company, 3.6878 cents.
No. 211, R. P. Andrews Paper Company, 4.95 cents.
No. 213, R. P. Andrews Paper Company, 15.80 cents.
No. 214, R. P. Andrews Paper Company, 14.80 cents.
No. 215, Mudge Paper Company, 14.75 cents.
No. 217, Paper Corp. of U. S., 3.372 cents.
No. 218, Paper Corp. of U. S., 3.372 cents.
No. 219, Paper Corp. of U. S., 3.124 cents.
No. 220, No bids received.
No. 251, Enterprise Paper Company, 9.555 cents.
No. 252, Cauthorne Paper Company, 4.798 per 1,000 sheets.
No. 254, Butler Company, 4.946 cents.
No. 255, Whitaker Paper Company, 5.21 cents.
No. 256, Stanford Paper Company, 6.03 cents.
No. 257, Stanford Paper Company, 6.58 cents.
No. 258, Cauthorne Paper Company, 5.08 cents.
No. 259, Cauthorne Paper Company, 4.61 cents.
No. 260, Rejected.
No. 261, Rejected.
No. 262, Link Paper Company, 6.70 cents.
No. 263, Barton, Duer & Koch Paper Company, 7.00 cents.
No. 264, Barton, Duer & Koch Paper Company, 3.40 cents.
No. 265, Whitaker Paper Company, 6.33 cents.
No. 271, Paper Corp. of U. S., 5.10 cents.
No. 276, Rejected.
No. 277, Rejected.
No. 280, Mudge Paper Company, 7.55 cents.
No. 281, No bids received.
No. 302, Whitaker Paper Company, 21.45 per 1,000 sheets.
No. 303, Barton, Duer & Koch Paper Company, 32.38 per 1,000 sheets.
No. 304, Enterprise Paper Company, 43.95 per 1,000 sheets.
No. 305, Rejected.
No. 306, Barton, Duer & Koch Paper Company, 3.99 cents.
No. 307, Barton, Duer & Koch Paper Company, 3.99 cents.
No. 308, Barton, Duer & Koch Paper Company, 3.99 cents.
No. 309, Barton, Duer & Koch Paper Company, 3.99 cents.
No. 310, Barton, Duer & Koch Paper Company, 3.99 cents.
No. 325, Barton, Duer & Koch Paper Company, 4.32 cents (3,000,000 pounds); R. P. Andrews Paper Company, 4.28 cents (3,000,000 pounds); Whitaker Paper Company, 4.33 cents (excess if needed).
No. 351, Whitaker Paper Company, 6.34 per 100 sheets.
No. 352, Old Dominion Paper Company, 16.249 per 100 sheets.
No. 360, R. P. Andrews Paper Company, 1.455 cents.
No. 361, Container Corp. of America, 1.1725 cents (550,000 pounds); Cauthorne Paper Company, 1.2215 cents (Balance of order).
No. 362, Mathers-Lamm Paper Company, 4.744 cents.
No. 364, Whitaker Paper Company, 1.782 cents.
No. 365, Barton, Duer & Koch Paper Company, 1.70 cents.
No. 366, Mathers-Lamm Paper Company, 3.375 cents.
No. 367, Mathers-Lamm Paper Company, 3.375 cents.
No. 368, Resolute Paper Products Corp., 4.90 cents.

Francis C. Huyck Dead

[FROM OUR REGULAR CORRESPONDENT]

RENSSELAER, N. Y., November 28, 1938—Francis C. Huyck, 64 years old, chairman of the board of directors of F. C. Huyck & Sons, died this week at his home following a brief illness. His father, the late Francis C. Huyck, Sr., founded the mill with which he became associated in 1898. He was prominent in civic and fraternal organizations and has served as head of the organization since the death of his brother, Edmund N. Huyck, several years ago. Prior to being chairman of the board he was vice president and president of the concern. Mr. Huyck was born in Rensselaerville where he maintained a palatial summer home. He was a member of several banks in Albany and also served in an advisory capacity for the Boy Scouts Council. He never was active in political affairs but enjoyed working on civic committees. He was also widely known as a philanthropist. He was affilited with the University Club, Fort Orange Club of Albany, and the Williams Club of New York City. The survivors include his wife, a son, a daughter and a sister.

EQUIPMENT IN NEW SOUTHERN MILLS

Machinery and Equipment	**Brunswick Pulp & Paper Co., Brunswick, Ga.** O. C. Schoenwerk, Engr.; Stone & Webster, Builders; Bleached Sulphate Pulp; 150 Tons Daily.	**Chesapeake-Camp Corp., Franklin, Va.** J. E. Sirrine & Co., Engr.; Rust Engr. Co., Builders; Sulphate Pulp and Kraft Paper and Board; 200 Tons Daily.	**Container Corp. of America, Fernandina, Fla.** Geo. F. Hardy, Engr.; Merritt, Chapman & Scott, Builders; Sulphate Pulp; 150 Tons Daily.	**National Container Corp., Jacksonville, Fla.** Johnson & Wierk, Inc., Engrs.; Merritt, Chapman & Scott, Builders; Sulphate Pulp and Kraft Board; 200 Tons Daily.
AFTER COOLERS				
AGITATORS		Dilts Machine Works MidWest-Fulton Machine Co.	Dilts Machine Works	Dilts Machine Works
AIR COMPRESSORS		Allis-Chalmers Mfg. Co. Ingersoll-Rand Co.	Ingersoll-Rand Co.	Pennsylvania Pump & Compressor Co.
AIR CONDITIONING	J. O. Ross Engineering		J. O. Ross Engineering	
AMMETERS				
ASBESTOS				
AUTO CALL SYSTEMS				
BARKING DRUMS	D. J. Murray Mfg. Co.	Fibre Making Processes	Manitowoc Engineering Works	Carthage Machine Works
BAROMETERS				
BEARINGS		SKF Industries		SKF Industries
BEATERS		Dilts Machine Works		Dilts Machine Works
BELTS		New York Rubber	Alexander Bros. B. F. Goodrich Co. U. S. Rubber Co.	
BINS	Chicago Bridge & Iron Co.	Babcock & Wilcox Co.		
BLEACHING PLANTS	Pulp Bleaching Corp.			
BLOWERS	Roots-Connersville Blower			
BOILERS	Babcock & Wilcox Co.	Babcock & Wilcox Co. M. A. Hofft Co.	Babcock & Wilcox Co.	Babcock & Wilcox Co. Combustion Engineering Co.
BRICK—Building		Grant Brick Works	Standard Brick & Tile Co.	
BRICK—Glass				
CABLES			Westinghouse Electric & Mfg. Co.	
CALENDERS				
CHIP SCREENS		Orville Simpson Co.	Orville Simpson Co.	W. S. Tyler Co.
CHIPPERS	General Electric Co. D. J. Murray Mfg. Co.	Fibre Making Processes D. J. Murray Mfg. Co.	Carthage Machine Co. Waterville Iron Works	Carthage Machine Co.
CHUTES			Jeffrey Mfg. Co.	
CLARIFICATION EQUIPMENT			Dorr Co.	
COMBUSTION CONTROL INSTRUMENTS	Bailey Meter Co.	Hagan Corp.	Bailey Meter Co.	Bailey Meter Co.
CONCRETE	Wack & Co.			
CONDENSATE SYSTEMS			Fibre Making Processes MidWest-Fulton Machine	Alpha Steam Specialty Co.
CONDENSER PLANTS	Fibre Making Processes		Fibre Making Processes	
CONDENSERS	Fibre Making Processes C. H. Wheeler Mfg. Co.	Allis-Chalmers Mfg. Co. C. H. Wheeler Mfg. Co.	Westinghouse Electric & Mfg. Co.	Foster-Wheeler
CONDUIT			Westinghouse Electric & Mfg. Co.	
CONTROL EQUIPMENT			Westinghouse Electric & Mfg. Co.	
CONTROL INSTRUMENTS	Bailey Meter Co. Foxboro Co.	Bailey Meter Co. Foxboro Co. Mason-Neilan Regulator Co.	Bailey Meter Co. Foxboro Co.	Foxboro Co. Mason-Neilan Regulator Co. Taylor Instrument Co.
CONVEYORS	Stephens-Adamson Mfg. Co.	Chain Belt Co.	Brady Conveyor Co. Jeffrey Mfg. Co. Mathews Conveyor Co. Stephens-Adamson Mfg. Co.	Jeffrey Mfg. Co. Link-Belt Co.
CRANES		Northern Engineering Works Reading Chain & Block Yale & Towne Mfg. Co.	Ohio Locomotive Crane Co. Reading Chain & Block	Northern Engineering Works
CRUSHERS	D. J. Murray Mfg. Co.	Fibre Making Processes D. J. Murray Mfg. Co.	Williams Mfg. Co.	Jeffrey Mfg. Co.
CUTTERS		Beloit Iron Works	Beloit Iron Works	

EQUIPMENT IN NEW SOUTHERN MILLS

Machinery and Equipment	St. Joe Paper Co., Port St. Joe, Fla. Geo. F. Hardy, Engr.; James Stewart & Co., Builders; Sulphate Pulp and Kraft Board; 350 Tons Daily.	Southern Kraft Corp., Georgetown, S. C. Southern Kraft Corp., Builders; Sulphate Pulp, Kraft Paper and Board; 600 Tons Daily.	Union Bag & Paper Corp. Savannah, Ga. Geo. F. Hardy, Engr.; Merritt, Chapman & Scott, Builders; Sulphate Pulp and Kraft Paper; 600 Tons Daily.	West Virginia Pulp & Paper Co., Charleston, S. C. West Virginia Pulp & Paper Co., Engr.; Morton C. Tuttle Co., Builders; Sulphate Pulp and Kraft Board; 350 Tons Daily.
After Coolers		Westinghouse Electric & Mfg. Co.		
Agitators		Dilts Machine Works	Dilts Machine Works	Noble & Wood Machine Co. Pulp Bleaching Corp.
Air Compressors	Chicago Pneumatic Tool Co.	Ingersoll-Rand Co.	Hardie-Tynes Mfg. Co.	Chicago Pneumatic Tool Co.
Air Conditioning			York Ice Machinery Co.	
Ammeters		General Electric Co.		
Asbestos		Philip Carey Mfg. Co.		
Auto Call Systems		American Automatic Electric Sales Co.		
Barking Drums	Fibre Making Processes	Fibre Making Processes	Fibre Making Processes Manitowoc Engineering Works	D. J. Murray Mfg. Co.
Barometers				C. J. Tagliabue Mfg. Co.
Bearings	SKF Industries	SKF Industries	SKF Industries	SKF Industries
Beaters	Shartle Bros. Machine Co.		Dilts Machine Works	Shartle Bros. Machine Co.
Belts		J. E. Rhoads & Sons		
Bins				
Bleaching Plants				
Blowers				
Boilers	Babcock & Wilcox Co.	Babcock & Wilcox Co.	Babcock & Wilcox Co. Hagan Corp. Smoot Engineering Co.	Babcock & Wilcox Co. Riley Stoker Corp.
Brick—Building			Standard Brick & Tile Co.	
Brick—Glass				Owen-Illinois Glass Co.
Cables		Anaconda Wire & Cable Co.	Westinghouse Electric Supply Co.	
Calenders				Farrel-Birmingham Co.
Chip Screens		Simplicity Mfg. Co.	W. S. Tyler Co.	Orville Simpson Co.
Chippers	Carthage Machine Co.	D. J. Murray Mfg. Co.	Carthage Machine Co.	D. J. Murray Mfg. Co.
Chutes			Steel Products Co.	
Clarification Equipment				
Combustion Control Instruments	Bailey Meter Co.	Smoot Engineering Co.	Bailey Meter Co. Smoot Engineering Co.	Republic Flow Meters Co.
Concrete				
Condensate Systems	MidWest-Fulton Machine	Fibre Making Processes	MidWest-Fulton Machine	
Condenser Plants	Fibre Making Processes		Fibre Making Processes	
Condensers		Westinghouse Electric & Mfg. Co.	Fibre Making Processes Foster-Wheeler Schutte & Koerting Co.	Foster-Wheeler
Conduit		Walker Mfg. Co.	Westinghouse Electrical Supply Co. Youngstown Sheet & Tube Co.	Clifton Conduit Co. Triangle Conduit Co.
Control Equipment				
Control Instruments	Bailey Meter Co.	Foxboro Co.	Foxboro Co.	Foxboro Co. Mason-Neilan Regulator Co.
Conveyors	Jeffrey Mfg. Co.	Chain Belt Co. B. F. Goodrich Co.	Jeffrey Mfg. Co. Stephens-Adamson Mfg. Co. U. S. Rubber Products Co.	Chain Belt Co. Jeffrey Mfg. Co. Robins Conveying Belt Co.
Cranes	Northern Engineering Works	Northern Engineering Works	Whiting Corp.	Shaw Box Crane & Hoist Co. Whiting Corp.
Crushers	D. J. Murray Mfg. Co.	D. J. Murray Mfg. Co.	Waterville Iron Works	D. J. Murray Mfg. Co.
Cutters			Hamblet Machine Co.	

EQUIPMENT IN NEW SOUTHERN MILLS

Machinery and Equipment	Brunswick Pulp & Paper Co., Brunswick, Ga.	Chesapeake-Camp Corp., Franklin, Va.	Container Corp. of America, Fernandina, Fla.	National Container Corp., Jacksonville, Fla.
CYCLONES		Chicago Bridge & Iron Co. Ingalls Iron Works **E. D. Jones & Sons Co.** Norfolk Tank	Chicago Bridge & Iron Co.	
DECKERS				Improved Paper Machinery
DERRICKS				
DESUPERHEATERS			Bailey Meter Co.	
DIFFUSERS		Norfolk Tank	Chicago Bridge & Iron Co.	
DIGESTER SYSTEM	**Fibre Making Processes**		**Fibre Making Processes**	Foster-Wheeler
DIGESTERS	**Blaw-Knox Co.**	**Blaw-Knox Co.**	Chicago Bridge & Iron Co.	Foster-Wheeler
DOCKS	**W. H. Greenfeld**			
DREDGING	**Parkhill Dredging Co.**			
DRIER CONTROL		Mason-Neilan Regulator Co.		
DRIER DRAINAGE EQUIPMENT	**MidWest-Fulton Machine**	**MidWest-Fulton Machine**	**MidWest-Fulton Machine**	
DRIVES	**General Electric Co.** **Improved Paper Machinery**	**Gates Rubber Co.** **Westinghouse Electric & Mfg. Co.**	Beloit Iron Works **General Electric Co.**	**General Electric Co.** **Westinghouse Electric & Mfg. Co.**
ELECTRIC EQUIPMENT				
ELECTRIC METERS	General Electric Co.			
ELEVATORS	Link-Belt Co.	Babcock & Wilcox Co. **Westbrook Elevator Mfg. Co.**	Stephens-Adamson Mfg. Co.	Revolvator Co.
EVAPORATORS	**Swenson Evaporator Co.**	**Swenson Evaporator Co.**	**Swenson Evaporator Co.**	Goslin - Birmingham Mfg. Co.
EXHAUST SYSTEMS	**J. O. Ross Engineering**	**J. O. Ross Engineering**	**J. O. Ross Engineering**	
FANS	Babcock & Wilcox Co.	B. F. Sturtevant Co.	Buffalo Blower Co. B. F. Sturtevant Co.	American Blower B. F. Sturtevant Co.
FEEDERS	**M. A. Hofft Co.**	**M. A. Hofft Co.** International Filter Co. Jeffrey Mfg. Co.	**M. A. Hofft Co.** Jeffrey Mfg. Co.	
FEED WATER HEATERS		**Elliott Co.**		
FEED WATER REGULATORS		Bailey Meter Co. Northern Equipment Co.	Bailey Meter Co.	
FEED WATER TREATMENT EQUIPMENT		**Hagan Corp.**		Permutit Co.
FELT CONDITIONERS		Bird Machine Co.		American Blower
FELT ROLLS				
FELTS		Albany Felt Co. **Wm. E. Hooper & Sons Co.** Waterbury Felt Co.		
FILTERS	Oliver United Filters	**Improved Paper Machinery** Roberts Filter Mfg. Co.	**J. E. Malone Co.**	Mount Chemical Equipment Co. Improved Paper Machinery
FITTINGS				
FLAT BOX DRAINAGE		**MidWest-Fulton Machine Co.**		
FLOW METERS	Bailey Meter Co.	Bailey Meter Co. Mason-Neilan Regulator Co.	Bailey Meter Co.	Bailey Meter Co. Brown Instrument Co. Taylor Instrument Co.
FLUES	Babcock & Wilcox Co.	Babcock & Wilcox Co.		
FOURDRINIERS	**Rice, Barton & Fales Co.**	**Pusey & Jones**	Beloit Iron Works	Pusey & Jones
FURNACES	Babcock & Wilcox Co. **M. A. Hofft Co.** Nichols Eng. & Research	Babcock & Wilcox Co. **M. A. Hofft Co.**	**M. A. Hofft Co.**	**M. A. Hofft Co.**
GAUGES	Bailey Meter Co.	Bailey Meter Co.		Consolidated Ashcraft-Hancock Co.
GEAR REDUCERS				

EQUIPMENT IN NEW SOUTHERN MILLS

Machinery and Equipment	St. Joe Paper Co., Port St. Joe, Fla.	Southern Kraft Corp., Georgetown, S. C.	Union Bag & Paper Corp. Savannah, Ga.	West Virginia Pulp & Paper Co., Charleston, S. C.
CYCLONES		Ingalls Iron Works	Chicago Bridge & Iron Co.	Chattanooga Boiler & Tank Co.
DECKERS			Improved Paper Machinery	
DERRICKS			American Hoist & Derrick Co.	
DESUPERHEATERS	Bailey Meter Co.	Swartwout Co.		
DIFFUSERS	Chicago Bridge & Iron Co.	Ingalls Iron Works	Chicago Bridge & Iron Co. Fibre Making Processes M. W. Kellogg Co.	
DIGESTER SYSTEM	Fibre Making Processes	Fibre Making Processes		
DIGESTERS	Chicago Bridge & Iron Co.	Babcock & Wilcox Co. Ingalls Iron Works	Chicago Bridge & Iron Co. M. W. Kellogg Co.	Combustion Engineering Co.
DOCKS				
DREDGING			Parkhill Dredging Co.	
DRIER CONTROL				
DRIER DRAINAGE EQUIPMENT	MidWest-Fulton Machine	MidWest-Fulton Machine	MidWest-Fulton Machine	MidWest-Fulton Machine
DRIVES	General Electric Co.	Allis-Chalmers Mfg. Co.	General Electric Co. Improved Paper Machinery	Westinghouse Electric & Mfg. Co.
ELECTRIC EQUIPMENT	General Electric Co.			
ELECTRIC METERS				General Electric Co. Westinghouse Electric & Mfg. Co. Weston Electric Instrument Co.
ELEVATORS	Jeffrey Mfg. Co.		Otis Elevator Co. Westinghouse Electrical Elevator Co.	Otis Elevator Co.
EVAPORATORS	Swenson Evaporator Co.	Swenson Evaporator Co.	Swenson Evaporator Co.	Goslin-Birmingham Co.
EXHAUST SYSTEMS	J. O. Ross Engineering		J. O. Ross Engineering	J. O. Ross Engineering
FANS		American Blower		
FEEDERS		M. A. Hofft Co.	M. A. Hofft Co.	M. A. Hofft Co.
FEED WATER HEATERS		Elliott Co.		Elliott Co.
FEED WATER REGULATORS	Bailey Meter Co.		Swartwout Co.	
FEED WATER TREATMENT EQUIPMENT				Chicago Bridge & Iron Co. Permutit Co.
FELT CONDITIONERS				
FELT ROLLS			Downingtown Mfg. Co.	
FELTS	Wm. E. Hooper & Sons Co.			
FILTERS	Oliver United Filters	Oliver United Filters	J. E. Malone Co. Oliver United Filters	Improved Paper Machinery
FITTINGS	Crane Co.	Chapman Valve Mfg. Co. Grinnell Co.		Tube Turns, Inc.
FLAT BOX DRAINAGE				A. E. Broughton & Co.
FLOW METERS	Bailey Meter Co.	Republic Flow Meters Co.		Republic Flow Meters Co.
FLUES			Steel Products Co.	
FOURDRINIERS	Beloit Iron Works	Beloit Iron Works	Pusey & Jones	Pusey & Jones
FURNACES	Nichols Eng. & Research	M. A. Hofft Co.	M. A. Hofft Co.	M. A. Hofft Co.
GAUGES	Bailey Meter Co.	Consolidated Ashcroft-Hancock Co.		Behrer-Nason Co. Consolidated Ashcroft-Hancock Co. Foxboro Co. U. S. Gauge Co. Reliance Gauge Column Co.
GEAR REDUCERS		D. O. James Mfg. Co.		Louis Allis Co. Boston Gear Works U. S. Electric Motors Westinghouse Electric & Mfg. Co.

EQUIPMENT IN NEW SOUTHERN MILLS

Machinery and Equipment	Brunswick Pulp & Paper Co., Brunswick, Ga.	Chesapeake-Camp Corp., Franklin, Va.	Container Corp. of America, Fernandina, Fla.	National Container Corp., Jacksonville, Fla.
GEARS	Louis Allis Co. General Electric Co.			
GENERATORS	General Electric Co.	Westinghouse Electric & Mfg. Co.	Westinghouse Electric & Mfg. Co.	
GLASS				
GRAB			Kiesler Mfg. Co.	
GRATINGS				
GRINDERS—Knife and Roll		Samuel C. Rogers Co.		Bridgeport Safety Emery Wheel Co. Lobdell Car Wheel Co.
HEATERS	Babcock & Wilcox Co. Fibre Making Processes	Babcock & Wilcox Co. Elliott Co.	Cochrane Co. Griscom-Russell Co.	
HEATERS—Unit		J. O. Ross Engineering		
HEATING EQUIPMENT		J. O. Ross Engineering	J. O. Ross Engineering	
HOISTS		Northern Engineering Works Reading Chain & Block Yale & Towne Mfg. Co.	Yale & Towne Mfg. Co.	
HOODS	J. O. Ross Engineering	J. O. Ross Engineering	J. O. Ross Engineering	Walker Jamar Co.
HYDRANTS				
INDUCED DRAFT FANS	Babcock & Wilcox Co.	B. F. Sturtevant Co.		
INSTRUMENTS	Foxboro Co. Republic Flow Meters Co.	Foxboro Co. Merritt Engineering & Sales Co.	Bailey Meter Co. Consolidated Ashcroft-Hancock Co.	
INSULATION	Guy M. Beatty Johns-Manville Co.	Guy M. Beatty Philip Carey Mfg. Co. Johns-Manville Co.	Guy M. Beatty Philip Carey Mfg. Co. Johns-Manville Co.	
JOINTS—Expansion				
JORDANS		E. D. Jones & Sons Co.		E. D. Jones & Sons Co.
KNOTTERS	Trimbey Machine Works	Improved Paper Machinery	Improved Paper Machinery	
LAYBOY		Moore & White Co.		
LIME FURNACE	Nichols Eng. & Research			
LIME KILN				Vulcan Iron Works
LUBRICATION SYSTEMS	S. F. Bowser & Co.		S. F. Bowser & Co.	S. F. Bowser & Co.
MATERIALS HANDLING EQUIPMENT	Link-Belt Co.	Jeffrey Mfg. Co.		
METERS	Bailey Meter Co.	Bailey Meter Co.	Bailey Meter Co.	
MOTORS	Louis Allis Co. General Electric Co.	Westinghouse Electric & Mfg. Co.	Electric Machinery Mfg. Co. General Electric Co. Westinghouse Electric & Mfg. Co.	General Electric Co. Westinghouse Electric & Mfg. Co.
MOVEABLE PLATFORMS				
OFFICE EQUIPMENT				
OIL BURNERS		Babcock & Wilcox Co.		Babcock & Wilcox Co. Combustion Engineering Co. Lee B. Metler
OIL CIRCUIT BREAKER				
OIL METERS				
PACKING				
PAINT				
PILES—Foundation	Raymond Concrete Pile Co.			
PIPE		Babcock & Wilcox Co. Pittsburgh Piping & Equip. Co.	Chicago Bridge & Iron Co. Crane Co. Johns-Manville Co.	

EQUIPMENT IN NEW SOUTHERN MILLS

Machinery and Equipment	St. Joe Paper Co., Port St. Joe, Fla.	Southern Kraft Corp., Georgetown, S. C.	Union Bag & Paper Corp. Savannah, Ga.	West Virginia Pulp & Paper Co., Charleston, S. C.
GEARS				Louis Allis Co. Boston Gear Works U. S. Electric Motors Westinghouse Electric & Mfg. Co.
GENERATORS	General Electric Co.			Westinghouse Electric & Mfg. Co.
GLASS			Pittsburgh Plate Glass Co.	
GRAB				
GRATINGS		Stupp Bros. Bridge & Iron Co.	American Abrasive Metal Co.	
GRINDERS—Knife and Roll				
HEATERS	Cochrane Co.	Elliott Co. General Electric Co.	Fibre Making Processes Foster-Wheeler	Elliott Co.
HEATERS—Unit	J. O. Ross Engineering	American Blower		
HEATING EQUIPMENT	J. O. Ross Engineering		J. O. Ross Engineering	J. O. Ross Engineering
HOISTS			American Monorail Co.	
HOODS	J. O. Ross Engineering		J. O. Ross Engineering	J. O. Ross Engineering
HYDRANTS			A. P. Smith Mfg. Co.	
INDUCED DRAFT FANS				Clarage Fan Co. B. F. Sturtevant Co.
INSTRUMENTS				
INSULATION	Guy M. Beatty	Guy M. Beatty	Guy M. Beatty Walker Jamar Co.	Guy M. Beatty
JOINTS—Expansion		Jos. Kopperman & Sons		
JORDANS	Shartle Bros. Machine Co.		E. D. Jones & Sons Co.	Noble & Wood Machine Co.
KNOTTERS		American Paper Mach. & Eng. Works	Improved Paper Machinery	Improved Paper Machinery
LAYBOY			Hamblet Machine Co.	
LIME FURNACE	Nichols Eng. & Research			
LIME KILN		Allis-Chalmers Mfg. Co.	Vulcan Iron Works	Traylor Engineering & Mfg. Co.
LUBRICATION SYSTEMS		S. F. Bowser & Co.	S. F. Bowser & Co.	
MATERIALS HANDLING EQUIPMENT	Link-Belt Co.			
METERS	Bailey Meter Co.		Bailey Meter Co. Smoot Engineering Co. Taylor Instrument Co. Trimbey Machine Works	Esterline-Angus Co. Schutte & Koerting Co.
MOTORS	General Electric Co.	Westinghouse Electric & Mfg. Co.	Diehl Mfg. Co. Electric Machinery Mfg. Co. General Electric Co.	Louis Allis Co. Electric Machinery Mfg. Co. General Electric Co. Reliance Electric & Eng. Co. Westinghouse Electric & Mfg. Co.
MOVABLE PLATFORMS			Reading Chain & Block	
OFFICE EQUIPMENT			Myrtle Desk Co.	
OIL BURNERS		Babcock & Wilcox Co.	Hauck Mfg. Co.	
OIL CIRCUIT BREAKER		General Electric Co.		
OIL METERS				National Meter Co.
PACKING		Garlock Packing Co.		
PAINT			Earl Paint Corp. Sherwin-Williams Co.	
PILES—Foundation				Tidewater Construction Co.
PIPE	Crane Co. Grinnell Co.		Crane Co. Crawford-Slaten & Co. Grinnell Co. Johns-Manville Co. Taylor Forge & Pipe Works U. S. Pipe & Foundry Youngstown Sheet & Tube Co.	Jones & Laughlin Steel Corp. Lock Joint Pipe Co. Lynchburg Foundry Co.

EQUIPMENT IN NEW SOUTHERN MILLS

Machinery and Equipment	Brunswick Pulp & Paper Co., Brunswick, Ga.	Chesapeake-Camp Corp., Franklin, Va.	Container Corp. of America, Fernandina, Fla.	National Container Corp., Jacksonville, Fla.
PIPE COVERING	Guy M. Beatty	Guy M. Beatty Philip Carey Mfg. Co. Johns-Manville Co.	Guy M. Beatty	
PLUG COCKS				
PULP BALER				
PULP DRIER MACHINES			Beloit Iron Works	
PULP PRESSES	Baldwin-Southwark	Baldwin-Southwark	Baldwin-Southwark	
PULP WASHERS	Oliver United Filters			
PULPERS		Bauer Bros. Co. Dilts Machine Works Fibre Making Processes		
PUMPS	Babcock & Wilcox Co. Nash Engineering Co. Warren Steam Pump Co.	Allis-Chalmers Mfg. Co. Babcock & Wilcox Co. Glens Falls Machine Works Ingersoll-Rand Co. Nash Engineering Co.	Goulds Pumps Ingersoll-Rand Co. LaBour Pump Co. Layne & Bowler Westco Pump & Machinery, Ltd. Worthington Pump & Mach.	Goulds Pumps LaBour Pump Co. Warren Steam Pump Co.
PUMPS—Boiler Feed		Allis-Chalmers Mfg. Co. Elliott Co.		Goulds Pumps
PUMPS—Centrifugal	Nash Engineering Co.	Allis-Chalmers Mfg. Co. Nash Engineering Co.		
PUMPS—Condensate	Warren Steam Pump Co. C. H. Wheeler Mfg. Co.	Allis-Chalmers Mfg. Co.	LeBlanc Co.	
PUMPS—Water Supply		Sydnor Pump & Well Co.		
RECAUSTICIZING SYSTEMS	Dorr Co.	Dorr Co.	Dorr Co.	Mount Chemical Equipment Co.
RECORDERS	Bailey Meter Co.	Mason-Neilan Regulator Co.	Bailey Meter Co. Leeds & Northrup Co.	Bailey Meter Co. Bristol Co. Brown Instrument Co. Mason-Neilan Regulator Co. Taylor Instrument Co.
RECOVERY SYSTEMS	Babcock & Wilcox Co.	Babcock & Wilcox Co.	Babcock & Wilcox Co.	
REFINERS		Bauer Bros. Co.	Dilts Machine Works	
REFRACTORIES	A. P. Green Fire Brick Co.	A. P. Green Fire Brick Co.	Laclede-Christy Clay Products Co.	
REGULATORS	General Electric Co. Trimbey Machine Works	Mason-Neilan Regulator Co. Merritt Engineering & Sales Co.	Brooke Engineering Co. Paper & Industrial Appliances	
REWINDERS		Cameron Machine Co.		
ROLL GRINDERS				
ROLLS	Stowe-Woodward	Stowe-Woodward		
ROOFING	R. J. Dorn & Co.	Philip Carey Mfg. Co.	Philip Carey Mfg. Co. Federal American Cement & Tile Co. Johns-Manville Co. Walker Jamar Co.	
ROTAMETER				
SASH	Campbell Metal Window			
SAVE ALLS		Improved Paper Machinery		Improved Paper Machinery
SCALES		Fairbanks, Morse & Co. Howe Scale Co. Toledo Scale Co.	Fairbanks, Morse & Co.	Fairbanks, Morse & Co. Toledo Scale Co.
SCREENS	Improved Paper Machinery	Glens Falls Machine Works Improved Paper Machinery	Improved Paper Machinery	Improved Paper Machinery
SIDING	R. J. Dorn & Co.			
SIZE MAKING EQUIPMENT				
SKIDS				
SPOUTS				
SPRINKLER SYSTEMS			Viking Co.	
SPROCKETS				
STACKS				

EQUIPMENT IN NEW SOUTHERN MILLS

Machinery and Equipment	St. Joe Paper Co., Port St. Joe, Fla.	Southern Kraft Corp., Georgetown, S. C.	Union Bag & Paper Corp. Savannah, Ga.	West Virginia Pulp & Paper Co., Charleston, S. C.
Pipe Covering	Guy M. Beatty	Guy M. Beatty	Guy M. Beatty	Guy M. Beatty Philip Carey Mfg. Co. Chas. S. Wood & Co.
Plug Cocks		Green Bay Barker & Mach. Works		
Pulp Baler			Economy Baler Co.	
Pulp Drier Machines				
Pulp Presses		Baldwin-Southwark		
Pulp Washers				
Pulpers	Fibre Making Processes			
Pumps	Goulds Pumps Layne & Bowler Nash Engineering Co.	Ingersoll-Rand Co. Quimby Pump Co.	Goulds Pumps Layne & Bowler Quimby Pump Co. Preferred Utilities Co.	Deming Co. Goulds Pumps Ingersoll-Rand Co. Morris Machine Works Quimby Pump Co. Warren Steam Pump Co. Worthington Pump & Mach.
Pumps—Boiler Feed		Ingersoll-Rand Co.		
Pumps—Centrifugal		Dayton-Dowd Co. Ingersoll-Rand Co. LaBour Pump Co.		
Pumps—Condensate		Westinghouse Electric & Mfg. Co.		
Pumps—Water Supply				Turbine Equipment Co.
Recausticizing Systems	Dorr Co.	Dorr Co.	Dorr Co.	Dorr Co.
Recorders	Bailey Meter Co.			Republic Flow Meters Co. Leeds & Northrup Co.
Recovery Systems	Babcock & Wilcox Co.	Babcock & Wilcox Co.		Babcock & Wilcox Co. Combustion Engineering Co.
Refiners	Wiener Refiner Eng. Co.		Bauer Bros. Co. Wiener Refiner Eng. Co.	
Refractories		Harbison-Walker Refractories Co.	General Refractories Co. Harbison-Walker Refractories Co. Quigley Co.	General Refractories Co. Harbison-Walker Refractories Co.
Regulators			Trimbey Machine Works	Allis-Chalmers Mfg. Co. Republic Flow Meters Co. Trimbey Machine Works
Rewinders			Cameron Machine Co.	Moore & White Co.
Roll Grinders		Farrel-Birmingham Co.	Lobdell Car Wheel Co.	Farrel-Birmingham Co.
Rolls	Stowe-Woodward	American Wringer Co.		Stowe-Woodward
Roofing	Brooks Roofing and Asphalt Co.		Federal American Cement & Tile Co. Lathrop-Hodge-Gypsum Co. Walker Jamar Co.	H. H. Robertson Co.
Rotameter		Schutte & Koerting Co.		
Sash	Detroit Steel Products Co.		J. P. Mills Truscon Steel Co.	
Save Alls	Oliver United Filters			
Scales		Toledo Scale Co.	Kron Co.	
Screens			Improved Paper Machinery E. D. Jones & Sons Link Belt Co.	Improved Paper Machinery
Siding				H. H. Robertson Co.
Size Making Equipment				Bennett, Inc.
Skids			Automatic Transportation Co.	
Spouts			Steel Products Co.	
Sprinkler Systems			Crawford-Slaten Co.	
Sprockets		Chain Belt Co. Link-Belt Co.		
Stacks		Ingalls Iron Works	M. W. Kellogg Co. Steel Products Co.	

EQUIPMENT IN NEW SOUTHERN MILLS

Machinery and Equipment	Brunswick Pulp & Paper Co., Brunswick, Ga.	Chesapeake-Camp Corp., Franklin, Va.	Container Corp. of America, Fernandina, Fla.	National Container Corp., Jacksonville, Fla.
STEAM TRAPS		Armstrong Steam Trap Co.	Strong, Carlisle & Hammond Co.	
STEEL	Virginia Bridge Co.	Bethlehem Steel Co. Levinson Steel Co. **Richmond Structural Steel Co.** **Truscon Steel Co.**	**Jones & Laughlin Steel** U. S. Steel	**Ingalls Iron Works** Jones & Laughlin Steel
STEEL FRAMING				
STOCK CHESTS		Chicago Bridge & Iron Co. **E. D. Jones & Sons Co.** Norfolk Tank		
SUCTION COUCH ROLLS	Stowe-Woodward		Beloit Iron Works	Downingtown Mfg. Co.
SUCTION PRESSES				Downingtown Mfg. Co.
SWITCHBOARD	General Electric Co.		**Westinghouse Electric & Mfg. Co.**	Westinghouse Electric & Mfg. Co.
SWITCHING EQUIPMENT	Allis-Chalmers Mfg. Co. General Electric Co.	**Allis-Chalmers Mfg. Co.** Westinghouse Electric & Mfg. Co.		
TACHOMETERS				
TANKS	Babcock & Wilcox Co. Chicago Bridge & Iron Co. **Kalamazoo Tank & Silo**	Babcock & Wilcox Co. Chicago Bridge & Iron Co. **E. D. Jones & Sons Co.** Norfolk Tank	Chicago Bridge & Iron Co. Graver Tank & Mfg. Co.	Ingalls Iron Works
TESTING INSTRUMENTS	**Foxboro Co.**	**Foxboro Co.**	**Foxboro Co.**	
THERMOMETERS				American Schaeffer & Budenbery Co.
THICKENERS	Improved Paper Machinery	**Improved Paper Machinery**	**Improved Paper Machinery**	**Improved Paper Machinery**
TILE			**Standard Brick & Tile Co.**	
TRANSFORMERS		**Westinghouse Electric & Mfg. Co.**	General Electric Co.	
TRAPS	Chicago Bridge & Iron Co.			
TREADS				
TROLLEYS				
TROUGHS				
TRUCKS	Baker-Rauling Co.		Auto. Electric Co.	Towmotor Co.
TURBINES	**General Electric Co.**	Elliott Co. **Westinghouse Electric & Mfg. Co.**	**Westinghouse Electric & Mfg. Co.**	General Electric Co.
UPTAKES				
VACUUM CONTROL	A. E. Broughton & Co.			
VACUUM PUMPS	**Nash Engineering Co.** **Roots-Connersville Blower**	**Nash Engineering Co.**		Nash Engineering Co. Roots-Connersville Blower
VALVES	Bailey Meter Co. Fibre Making Processes	Chapman Valve Mfg. Co. Edward Valve & Mfg. Co. **Fairbanks Co.** **Fibre Making Processes** **Fisher Governor Co.** **Mason-Neilan Regulator Co.** Merco Nordstrom Valve Co. **Northern Equipment Co.** Valley Iron Works Yarnall-Waring Co.	Brooke Engineering Co. Consolidated Ashcroft-Hancock Co. Crane Co. **Edward Valve & Mfg. Co.** Jenkins Bros. Valve Co. Lunkenheimer Co. Walworth Co.	Crane Co. DeZurik Shower Co. Merco Nordstrom Valve Co. Reading-Pratt & Cady Co.
VAPOR ABSORPTION SYSTEMS			J. O. Ross Engineering	
VATS	**Improved Paper Machinery**		J. O. Ross Engineering	
VENTILATING EQUIPMENT	**J. O. Ross Engineering**	**J. O. Ross Engineering**		**Improved Paper Machinery**
WASHERS		Glens Falls Machine Works		
WASH PANS		Bailey Meter Co.		
WATER FLOW METERS		Roberts Filter Mfg. Co.	Cochrane Corp.	
WATER SOFTENER		Sydnor Pump & Well Co.	Layne & Bowler	Layne & Bowler
WELLS	Layne & Bowler			
WET MACHINES				

EQUIPMENT IN NEW SOUTHERN MILLS

Machinery and Equipment	St. Joe Paper Co., Port St. Joe, Fla.	Southern Kraft Corp., Georgetown, S. C.	Union Bag & Paper Corp. Savannah, Ga.	West Virginia Pulp & Paper Co., Charleston, S. C.
STEAM TRAPS		Strong, Carlisle & Hammond Co.	Strong, Carlisle & Hammond Co.	Strong, Carlisle & Hammond Co.
STEEL			Austin Co. Jones & Laughlin Steel Steel Erectors, Inc. Steel Products Co. Tennessee Coal, Iron & R. R. Co. Virginia Bridge Co.	Virginia Bridge Co.
STEEL FRAMING		Stupp Bros. Bridge & Iron Co.		
STOCK CHESTS				Chattanooga Boiler & Tank Co.
SUCTION COUCH ROLLS				
SUCTION PRESSES				
SWITCHBOARD	General Electric Co.		General Electric Co.	
SWITCHING EQUIPMENT		Westinghouse Electric & Mfg. Co.		Allis-Chalmers Mfg. Co. Cutler-Hammer General Electric Co. I.T.E. Circuit Breaker Co. Wolfe & Mann Mfg. Co.
TACHOMETERS				James G. Biddle Co.
TANKS	Chicago Bridge & Iron Co. Hammond Iron Works	Ingalls Iron Works	Chicago Bridge & Iron Co. Hammond Iron Works Houser Stander Tank Co. Preferred Utilities Co.	Chattanooga Boiler & Tank Co.
TESTING INSTRUMENTS		Foxboro Co.	Foxboro Co.	Foxboro Co.
THERMOMETERS		Foxboro Co.		Minneapolis-Honeywell Co. Moeller Co.
THICKENERS		Dorr Co.	Improved Paper Machinery	Improved Paper Machinery
TILE			Federal American Cement & Tile Co.	National Fireproofing Co.
TRANSFORMERS	General Electric Co.	Allis-Chalmers Mfg. Co.	General Electric Co.	General Electric Co.
TRAPS			Chicago Bridge & Iron Co.	
TREADS		Arrowhead Iron Works	American Abrasive Metal Co.	
TROLLEYS			American Monorail Co.	
TROUGHS			Steel Products Co.	
TRUCKS			Automatic Transportation Co.	
TURBINES	General Electric Co.	General Electric Co.	General Electric Co.	Westinghouse Electric & Mfg. Co.
UPTAKES			Steel Products Co.	
VACUUM CONTROL				A. E. Broughton & Co.
VACUUM PUMPS	Nash Engineering Co.		Roots-Connersville Blower	Nash Engineering Co.
VALVES	Bailey Meter Co. Crane Co. Grinnell Co.	Chapman Valve Mfg. Co. Consolidated Ashcroft-Hancock Co. Schutte & Koerting Co. Swartwout Co.	Atwood & Merrill Co. Crane Co. A. P. Smith Mfg. Co.	Chapman Valve Mfg. Co. Darling Valve & Mfg. Co. Reading-Pratt & Cady Co. Record Foundry & Mach. Co.
VAPOR ABSORPTION SYSTEMS		J. O. Ross Engineering		J. O. Ross Engineering
VATS				
VENTILATING EQUIPMENT	J. O. Ross Engineering		J. O. Ross Engineering	J. O. Ross Engineering
WASHERS	Oliver-United Filters			
WASH PANS				Chattanooga Boiler & Tank Co.
WATER FLOW METERS	Bailey Meter Co.			Simplex Valve & Meter Co.
WATER SOFTENER			Permutit Co.	
WELLS			Layne & Bowler	
WET MACHINES	Layne & Bowler	Glens Falls Machine Works	Improved Paper Machinery	Improved Paper Machinery

RFC to Help Build Newsprint Mill at Lufkin

Apparently convinced that manufacture of newsprint paper from Southern slash pine has passed the experimental stage, the Reconstruction Finance Corporation, according to *New York Tribune,* has agreed to lend $3,425,000 to Southland Paper Mills, Inc., to build one of the largest newsprint plants in Texas, estimated to cost $3,750,000.

With the R. F. C. partly financing a new industry, the successful establishment and operation of the mill may open possibilities for plants in Louisiana and other Southern states, where slash pine grows in abundance.

Sale of Stock Planned

The RFC loan to Southland Paper Mills, Inc., was disclosed in the corporation's registration statement filed with the Securities and Exchange Commission Tuesday for the sale of stock to raise $1,615,000 in cash for the construction of the plant, which will be located near Lufkin, Tex., and for working capital.

Southland Paper Mills has already acquired 108,000 acres of timberlands from four concerns and has purchased a one-half interest in Angelina & Neches River Railroad Company, a thirty-mile road connecting the proposed mill site with Southern Pacific Railroad and the St. Louis & Southwestern. With short spurs the Angelina & Neches can be connected with Missouri Pacific and Aatchison, Topeka & Santa Fe lines.

The new paper company, organized on June 13, 1938, under Texas laws, is headed by E. L. Kurth, president and director, of Lufkin, Tex.; S. W. Henderson Jr., also of Lufkin, is secretary, while Arthur Temple is vice-president, and Albert Newcombe, of Perkins-Goodwin Company, New York City, is treasurer.

Newspapermen on Board

On the board of directors are E. M. Dealey, of *The Dallas News,* Dallas, Tex.; E. K. Gaylord, of *The Oklahoman,"* Oklahoma City, Okla.; Paul Sanderson, of Trinity, Tex.; W. C. Trout, of Lufkin, and Alex F. Weisberg, of Dallas. Messrs. Kurth, Temple and Newcombe will also serve on the board.

Southland Paper Mills registered with the S. E. C. under the 1933 securities act 200,000 shares of common stock, 100,000 of which are reserved for conversion of the preferred and 100,000 of preferred.

The company purposes to raise $1,615,000 in cash by the sale of 80,750 units of its stock, each unit consisting of one share of preferred and one of common. Each unit will be sold at $20. Additional units may be sold, if necessary, at the same price.

If any registered stock, over and above the 80,750 units is offered for property or services, these units will also be offered at $20 each.

Plant to Cost $3,750,000

The registration statement states that it is estimated that the $1,615,000 of proceeds from the sale of the units, together with $3,425,000 of R. F. C. money will be devoted as follows: $3,750,000 for the construction of the newsprint paper manufacturing plant; $400,000 for engineer's fee and field and administration and legal expenses, and $890,000 for working capital.

Perkins-Goodwin Company, of 30 Rockefeller Plaza, New York City, holds 42,916 shares of Southland Paper Mills, Inc., common stock, or more than 10 per cent of the corporation's outstanding common. The total authorized common is 500,000 shares, while the total outstanding is 143,916. The shares were issued to Perkins-Goodwin Company in full payment for all services rendered or will be rendered. George F. Hardy of New York is the designing and consulting engineer in charge of the job, in collaboration with the engineering division of the RFC. The mill will be built by Merritt, Chapman & Scott Corporation.

The registration statement states there are no underwriters for the 100,000 shares of no-par common.

"To newspaper publishers," the registration statement sets forth, 'registered stock will be offered in units (each unit consisting of one share of preferred and one of common stock) at $20 a unit, payable in cash at subscriber's option either (A) as and when called for by the board of directors, (B) one-third thereof when construction of registrant's mill actually commences, one-third thereof one year from such date with interest at 6 per cent annually, and one-third thereof two years from such date, with interest at 6 per cent annually.

"But," it is added, "newspaper publisher subscribers wil lnot be called upon to pay the second or third payments above mentioned on their subscriptions until the registrant company shall have collected from non-newspaper publisher subscriptions to its stock as much as $675,000 in cash upon their subscriptions."

United Gas Pipe Line Company will be offered 7,500 such units of stock at $20 a unit, while to all cash subscribers other than those mentioned above, units will also be offered at $20 each.

Southland Paper Mills has also issued 7,500 units

EQUIPMENT IN NEW SOUTHERN MILLS

Machinery and Equipment	Brunswick Pulp & Paper Co., Brunswick, Ga.	Chesapeake-Camp Corp., Franklin, Va.	Container Corp. of America, Fernandina, Fla.	National Container Corp., Jacksonville, Fla.
WINDERS		Cameron Machine Co.		
WINDOWS				
WIRE	Anaconda Wire & Cable Co.	Allegheny Industrial Electric Co. Appleton Wire Works	Westinghouse Electric & Mfg. Co.	
WIRE STRAPPING AND TOOL	C. Tennant, Sons & Co. of N. Y., Griplock Div.		C. Tennant, Sons & Co. of N. Y., Griplock Div.	

Financial News of Pulp and Paper Industry

of its stock in full payment of a one-half interest in the Angelina & Neches River Company, to the owners of this one-half interest who transferred to Southland.

Describing the RFC loan, the registration statement discloses: "The principal of said loan will be payable in monthly payments of $20,000 each of five years commencing December 31, 1940, one year succeeding the date on which construction of the registrant's plan is completed, whichever is earlier, and $30,000 monthly thereafter, the balance on a date ten years from the date on which such first payment is required to be made; or 50 per cent of the registrant's net earnings provided that such earnings shall be computed annually before depreciation and after giving effect to the payment of taxes, including income taxes, owed by the registrant for the immediately preceding fiscal year, and after allowances for expenditures for necessary maintenance and replacements, such expenditures to be approved by RFC when such net earnings are computed, whichever is greater.

Southland Paper Mills is to have the privilege of paying the loan on or before the maturity dates agreed upon. The loan is to be secured by a first mortgage indenture in such form as may be required by the RFC against the newsprint paper manufacturing plant to be constructed against 108,000 acres of timberlands, and against a one-half interest in Angelina & Neches River Railroad Company, and other assets acquired or to be acquired by the registrant.

The 108,000 acres of timberlands were acquired by Southland from Angelina County Lumber Company, Southern Pine Lumber Company, Texas Long Leaf Lumber Company, and W. T. Carter & Bro. The corporation has given the lumber companies 40,500 of its preferred-common stock units for the properties.

NEW YORK STOCK EXCHANGE

High, Low and Last for the Week Ending November 30, 1938

	High	Low	Last
Armstrong Cork Co.	52⅝	49	51⅞
Celotex Corp.	14⅜	13¼	14
Celotex Corp., pf.	66¼	62	62
Certain-Teed Products Corp.	10¼	9½	10
Certain-Teed Products Corp., pf.	40⅜	39	40½
Champion Paper & Fibre Co.	30⅞	28¾	30¼
Champion Paper & Fibre Co., pf.	100	99½	100
Congoleum-Nairn Co.	27¼	25½	26½
Container Corp. of America	15½	14¼	14½
Continental-Diamond Fibre Co.	9¾	9¼	9¾
Crown-Zellerbach Co.	13¼	12⅜	13¼
Crown-Zellerbach Co., pf.	91	89¾	91
Flintkote Co.	26⅜	24¾	26⅜
Robert Gair	3⅞	3⅝	3¾
Robert Gair, pf.	12½	11¾	11¾
International Paper & Power	13	11	12⅜
International Paper & Power, pf.	46¾	42¼	46
Johns-Manville Corp.	101	96¼	101
Johns-Manville Corp., pf.	137	126½	126½
MacAndrews & Forbes	29⅛	29	29
MacAndrews & Forbes, pf.	121½	121½	121½
Masonite Corp.	55½	53	54
Mead Corp.	12	11	11½
Mead Corp., pf.	68	68	68
Paraffine Companies, Inc.	58¾	56¾	57
Ruberoid Co.	29½	28¾	29¼
Scott Paper Co.	50¾	50	50
Sutherland Paper Co.	30	28½	30
Union Bag & Paper Corp.	12⅝	11¾	12
United Paperboard Co.	7½	7	7¼
U. S. Gypsum Co.	105	102¾	105
U. S. Gypsum Co., pf.	173	172½	172½

NEW YORK CURB EXCHANGE

High, Low and Last for the Week Ending November 30, 1938

	High	Low	Last
American Box Board Co.	9⅜	9⅜	9⅜
Brown Co., pf.	20	20	20
St. Regis Paper Co.	3⅛	2⅞	3
Taggart Corp.	5⅛	5	5

"Finn Jamison" Week

Paper merchants al lover the country are receiving currently a rapid fire series of striking and stimulating bulletins from the office of The National Paper Trade Association referring to "Fin" Jamison Week. "Fin" is the affectionate nickname applied by the many merchants and manufacturers who are personal friends of Finley T. Jamison, Interstate Cordage and Paper Company, Pittsburgh, vice-president in charge of the Wrapping Division of the Association.

There was an enthusiastic response to the suggestion made by Frank Vaughan of the Bay West Paper Company in his recent convention address that this title be used for a period to be devote to an intensive membership drive. He proposed that members in their respective Local Associations join in a vigorous campaign to bring in new members, thereby increasing the strength and united influence of the entire Wrapping Paper Division of the National Association.

The week of December 5 has been set in many territories, local officers and committees have been active in promotional efforts, and a number of meetings have been arranged in several cities to give impetus to the campaign. This includes personal calls and letters to non-member Wrapping Paper merchants whose cooperation will give increased support to the organized efforts to promote the interests of merchants and better conditions in the Wrapping Paper trade. It is believed that this special drive and educational program will give non-members a better idea of the important work which the Association is doing from which they also benefit, and will impress them with the sincerity of those who are contributing to its not only financially but with their own time and effort.

EQUIPMENT IN NEW SOUTHERN MILLS

Machinery and Equipment	St. Joe Paper Co., Port St. Joe, Fla.	Southern Kraft Corp., Georgetown, S. C.	Union Bag & Paper Corp. Savannah, Ga.	West Virginia Pulp & Paper Co., Charleston, S. C.
WINDERS	Bagley & Sewall Co.			Cameron Machine Co.
WINDOWS				William Bailey Co.
WIRE	Allegheny Industrial Electric Co.		American Steel & Wire Co. Maryland Steel Products Co.	Anaconda Wire & Cable Co. General Electric Co. Okonite Co. John A. Roebling's Sons Co.
WIRE STRAPPING AND TOOL				

PAPER TRADE JOURNAL

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COMING EVENTS IN THE PAPER INDUSTRY

NEW ENGLAND SECTION. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Nonotuck Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION. Technical Association of the Pulp and Paper Industry—Second Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park American Hotel, Kalamazoo, Mich.

EXPANSION IN THE PAPER INDUSTRY

The current year has been another extremely important and interesting one so far as the construction of new mills as well as improvements to going mills in the pulp and paper industry are concerned. Owing to the depression, activity this year has been somewhat slower than last year, but the year, nevertheless, has been outstanding in this respect.

This issue of the PAPER TRADE JOURNAL, which is the Annual Mill and Mill Equipment Number, is as usual devoted to some of the more noteworthy construction work and installation of machinery that has been taking place in the industry in the recent past. This makes an impressive exhibit and tells the story of the expansion that is taking place in the pulp and paper industry at the present time more effectively, perhaps, than could be done in any other way. Owing to space limitations not all the improvements unfortunately that seem worthy of description could be included in this issue, but a sufficient number has been described to form a vivid picture of just what has been taking place in the industry throughout the various sections of the country.

As showing the marvelous development of the pulp and paper industry on the North American continent, several articles in this number will be found of special interest. First in importance of these is the description of the great new plant of the Quebec North Shore Paper Company at Baie Comeau, Quebec. This mill under the able direction of Arthur A. Schmon, went into operation early in January of this year, a full six months ahead of schedule. In building this plant numerous interesting problems had to be solved and this was accomplished successfully in spite of the fact that construction was rushed along at such great speed. The mill was built to furnish the newsprint supply for the *Daily News* of New York, a newspaper with the largest circulation in America. Another article of more than usual interest is the description of the new bleached sulphite plant of the British Columbia Pulp and Paper Company, Ltd., at Woodfibre, B. C. This mill is said to be an example of one of the most highly developed plants of the kind anywhere in the world.

While the pace at which development has been proceeding in the South has slowed down perceptibly, the activity in the pulp and paper field there is still of an intensely interesting character. The new mills that have come into operation there this year have already been described in earlier numbers of the PAPER TRADE JOURNAL or are not as yet ready to be described. Of the new Southern mills the most recent to go into operation is that of the Southern Kraft Corporation, at Springhill, La. Partial operations were started here several months ago but at that time only pulp was made and the manufacture of paper is only now being started.

The business depression also caused construction work to be held up at the plant of the Fernandina Pulp and Paper Company, which is known now as the Fernandina Division of the Rayonier, Inc.; at Fernandina, Fla. This plant, which will make bleached sulphite pulp was originally designed to go into operation this fall.

Less mills are being built now in the South than at any other time since the Southern development got under way with such explosive suddenness about two and one-half years ago and the present construction includes none of the great kraft paper and board mills which figured so prominently in the early development. Among the construction that is going on in the South at the present time is the wall board mill of the Johns-Manville Corporation at Jarratt, Va., and the cigarette paper mill of the Ecusta Paper Corporation at Brevard, N. C. This apparently indicates that construction in the South is to be of a more diversified character in the future than it has been in the past.

The project to make newsprint from Southern pine at Lufkin, Texas, has not yet materialized, and numerous other rumors regarding the building of newsprint mills in the South have been found on investigation to have been circulated by persons with a careless regard for facts.

While it may be observed from the foregoing

that the expansion of the pulp and paper industry in the South has been slowed up quite noticeably at the present time, this development is bound to continue and marvelous progress will surely be made within the next ten years.

Work of Import Committee

Action has been taken by the Import Committee to check unfair competition in the M. G. Kraft paper field, where some buyers, particularly in the southeastern states, are securing such paper at prices even below those fixed by the Scandinavian kraft cartel. As a result of the committee's efforts, the dutiable value of such paper will be increased to the true foreign value, which is about 30 per cent higher than the actual selling price.

Meanwhile, a type of striped foreign paper is being imported which is decorated with a device patented in the United States. Paper produced in such a manner is dutiable at 4½ cents per pound and 10 per cent. The Customs officials are investigating the processes used abroad with a view to imposing the higher duty if the information provided by the Import Committee is confirmed through official channels.

Importers of beer mat board have been so adversely affected by Customs Court decisions increasing the amount of duty collected for such material that there may be an opportunity for domestic producers to supply the board now being imported from Austria and Germany. The name of the consumer will be provided by the Import Committee to any American manufacturer who would like to supply this consumer.

Japanese coffee filtering discs, classified for duty as tissue paper, were held by the United States Customs Court to be dutiable as filtering paper at a lower rate of duty, but the Customs Court held that while this rate was fixed on the paper because of its evident purpose, the same rule might not hold true for identical paper imported in sheets. An appeal is being taken by the Government from the decision and will contend that the higher rate is applicable.

Crossett Paper Mills Expanding

New construction involving the expenditure of about $750,000 on five additional units to the mill of the Crossett Paper Mills at Crossett, Ark., was started October 17. Plans provide for building a new finishing and storage room, a power plant, installation of a turbine generator, construction of a bleaching plant and a mill for recovery of oil by-products. The job is being done by Rust Engineering company of Pittsburgh, Pa., builders of the original $3,800,000 mill in 1936.

The two-story brick extension to the finishing room will be 64 feet wide and 128 feet long and will be added to the west end of the present building. The new power plant will provide electrical energy to meet the increased demand for power and will eliminate the purchase of additional current from commercial power concerns, engineers said.

The power plant also involves installation of an emergency steam boiler. The output capacity of finished products will be increased by the bleaching plant.

Production Ratio Report

These statistics are based upon paper production reports to the American Paper and Pulp Association.

COMPARATIVE MONTHLY SUMMARIES

Months	1938(c)	1937(c)	1936	1935	1934
January	63.9%	90.3%	76.1%	65.8%	.....
February	68.7%	90.1%	77.9%	70.0%	.....
March	69.6%	90.3%	76.0%	70.5%	.....
April	68.3%	92.1%	82.3%	70.0%	.....
May	69.0%	90.6%	81.6%	69.4%	.....
June	66.0%	87.3%	80.7%	72.3%	.....
July	72.0%	81.8%	77.3%	64.9%	.....
August	77.2%	82.9%	81.5%	70.9%	.....
September	76.3%	78.6%	80.5%	71.9%	58.2%
October	82.5%	73.5%	87.6%	75.6%	64.7%
November	.....	61.9%	88.0%	75.3%	61.7%
December	.....	54.5%	85.9%	71.2%	59.6%
Year Average	.....	80.6%	81.3%	70.5%	.....
First 46 weeks	71.9%	84.1%	80.7%	70.3%	.....

COMPARATIVE WEEKLY SUMMARIES

CURRENT WEEKS, 1938		CORRESPONDING WEEKS, 1937	
*October 15	83.0%	October 16	74.8%
*October 22	83.8%	October 23	73.6%
*October 29	81.8%	October 30	68.8%
*November 5	82.7%	November 6	65.3%
*November 12	80.4%	November 13	61.7%
*November 19	80.6%	November 20	62.5%

The following statistics show the number of mills reporting by ratio groups:

	Number of Mills Reporting, Current Weeks					
Ratio Limits	Oct. 15, 1938	Oct. 22, 1938	Oct. 29, 1938	Nov. 5, 1938	Nov. 12, 1938	Nov. 19, 1938
0% to 50%	64	60	55	63	73	52
51% to 100%	242	245	251	241	221	186
Total Mills Reporting	306	305	306	304	294	238

* Subject to revision until all reports are received.
(c) Basic capacity data have been adjusted to correspond with ratings reported by individual companies.

PAPERBOARD OPERATING RATIOS

According to reports from the National Paperboard Association, per cents of operation based on "Inch-Hours", were as follows:

Mos.	1938 (e)	1937 (e)	1936	1935	Mos.	1938 (e)	1937 (e)	1936	1935
Jan.	55%	80%	61%	61%	July	57%	67%	69%	59%
Feb.	61%	86%	67%	67%	Aug.	66%	74%	75%	65%
Mar.	60%	87%	68%	67%	Sept.	66%	70%	76%	69%
Apr.	57%	89%	70%	61%	Oct.	70%	66%	82%	76%
May	58%	86%	68%	61%	Nov.	.....	56%	79%	70%
June	56%	75%	68%	65%	Dec.	.....	46%	74%	60%

Week end. Oct. 15, 1938—70%
Week end. Oct. 22, 1938—70%
Week end. Oct. 29, 1938—69%
Week end. Nov. 5, 1938—68%
Week end. Nov. 12, 1938—66%
Week end. Nov. 19, 1938—67%

(e) Basic figures revised to include new members of the National Paperboard Assn.

Scott Installs Beloit Fourdrinier

Scott Paper Company is rapidly completing the construction of an addition to its mill at Chester, Pa. Early next year, the concern expects to put into production its eighth paper machine and thereby step up production by 15 per cent.

The new machine, which is being built by the Beloit Iron Works, has been designed exclusively for the production of tissue toweling, at a speed of over 1000 feet a minute.

The Scott Paper Company is also adding to its finishing equipment, power plant capacity and water plant.

The entire plant expansion program of the company calls for an expenditure of approximately two and a half million dollars. To meet this expenditure, Scott recently floated an issue of 30,000 shares of $4.50 cumulative preferred stock.

Sales of the company for 1938 are reported to be running at the rate of over sixteen billion dollars, an increase of about 20 per cent over 1937.

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Section of the
Technical Association of the Pulp and Paper Industry

Edited by Ronald G. Macdonald. Secretary

The Morse Chain Drive on New York State College of Forestry Paper Machine*

By R. J. Koch,[1]

Fig. 1 shows the original drive on the machine at the School of Forestry. We understand that this is typical of a great many mills in this section of the state, especially the older mills. You will note how cumbersome and bulky it was and the small amount of space between the equipment and the walls. We would say that 65 to 70 per cent efficiency is all this type of equipment could be made to produce. In other words, to transmit a 50 h.p.-load, it would be necessary to have at least a 75 h.p.-motor. Not only is the equipment big, bulky, and inefficient, but there is not the fine control available that is desired today by most mills.

Fig. 2 shows a view of the same machine after new equipment had been installed. There are six units in this installation, and their efficiency is about 98 per cent. There is plenty of room behind the unit. The unit is but 30 inches high, yet, each individual drive is capable of transmitting at least 25 h.p. continuously. This smaller unit is possible because we are working with high speeds. Naturally,

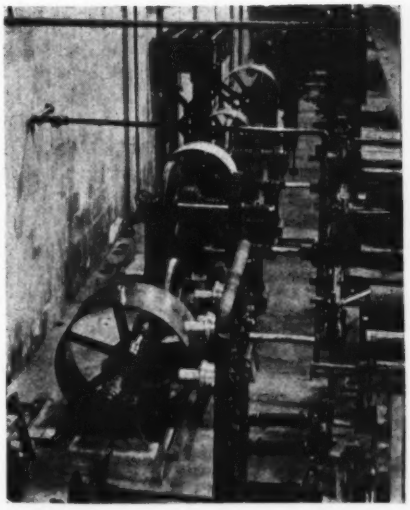


FIG. 1.

FIG. 2.

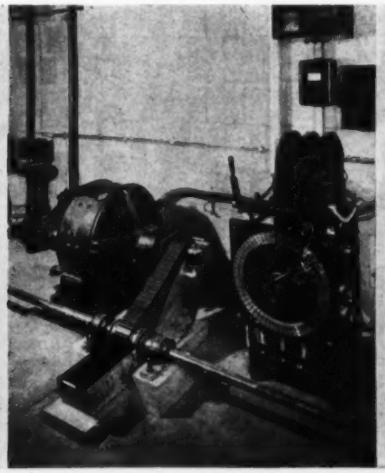


FIG. 3.

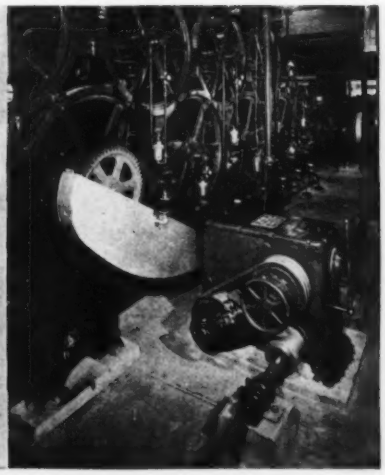


FIG. 4.

* Presented at the meeting of the Empire State Section of the Tecinical Association of the Pulp and Paper Industry, November 19, 1938.

[1] Asst. Sales-Mgr., Morse Chain Co.

when you are running the unit two to three times the speed formerly used, it is possible to use a unit one-half to one-third the size. There is nothing in this unit that is untried. SKF bearings, Allis-Chalmers variable speed sheaves, Tex-ropes, chain drives, friction clutches, chain flexible couplings are all well-known in the general industrial field as well as the paper field. All we have done is take these units and combine them into an attractive self-contained unit and apply it to the paper machine.

Fig. 3 shows the source of power, together with the drive from the motor to line shaft. You will note that the case seems abnormally large. It was made this way so that any line shaft speed could be used thereby having a more flexible unit. Let us bear in mind that at the University it is desirable to be able to make tissue one week and perhaps box-board the following week. At present on the drive you will see the motor runs between 750 to 1500 r.p.m. and there is a slight reduction giving a line shaft speed of 1340 r.p.m. at maximum motor speed. The driven sprocket is of split construction, making it very easy to change the sprocket to get a slower line-shaft speed. The particular chain case on this installation will permit a line-shaft speed as low as 270 r.p.m. when the motor is running at maximum speed by the use of a 140-tooth driven sprocket.

Fig. 4 shows a close-up of the unit. The units are connected together with shafting and flexible couplings. When the clutch is in neutral position, the line shaft runs and the unit stands idle. The clutch is then thrown in and the power is transmitted through the unit to the out-put shaft, and the speed of each unit is determined by the silent chain drive from the unit to the machine.

Fig. 5 shows the operation of the unit. Power is transmitted from the driving shaft by means of a

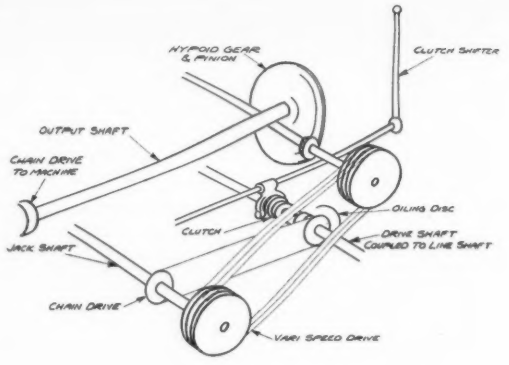


FIG. 5.

clutch and through a one to one ratio chain drive to a jack-shaft from which a vari-speed v-belt drive is taken. Proper belt tension is maintained by an adjustable mounting for the jack-shaft. The driven shaft of the vari-speed drive carries a hypoid pinion driving to the gear on the out-put shaft with a four to one reduction. From the out-put shaft to the machine a chain drive is provided of such ratio as to give the correct speed to that section of the machine. The unit speed can be adjusted and held at proper speed by use of the variable pitch wheels. This permits a speed variation of 30 per cent. The unit is automatically lubricated. The hypoid gear has its own lubricant in a separate section of the case. The clutch and chain drive run in the oil with a disc providing lubrication for the upper bearing. It would be our judgment that the oil in the case need be changed not oftener than two or three times a year.

A New Fuzz Detector

By G. E. Holman[1]

It is well known that the usual bond tests are unsatisfactory when applied to the detection or determination of certain small fibers which become easily detached from the sheet during printing operations. A certain stock may have a relatively high bond, (10 or 12) as determined by the Dennison wax pick test, but still give much trouble at the press from the above mentioned fibers, which the bond test failed to detect.

It should be pointed out that these fibers in question differ from what is usually designated as fuzz in that the former cannot be revealed until slight friction has been applied, while the latter are already standing out from the surface. In other words, a stock may show little or no fuzz before being printed, yet cause considerable trouble from something analogous.

A simple friction test has been applied to boxboard that has made it possible to predict with a fair degree of certainty how a particular stock will perform at press under a given set of conditions, with regard to the type of fuzz now under consideration. Although serving more for comparative purposes, the test has made it possible for the printer to set up standards which the boxboard manufacturers who supply him can follow.

It is not however, possible to set up a universal standard due to the wide variation in factors in different printing establishments and in different jobs. For example, a certain stock may cause trouble under one set of printing conditions and be satisfactory under another.

For use in connection with this test an apparatus has been devised that has proven to be not only useful for the examination of both boxboard and paper for fuzz, but for the general inspection of paper surfaces, identification of felt and wire sides, etc. A wide range of lighting effects can be obtained, and with proper adjustment it is possible to illuminate only the fuzz, which stands out strongly against a dark background.

Details of the Test

A five hundred gram weight having a smooth, flat base, and a diameter of about two inches, is wrapped in four thicknesses of cheese cloth of fine mesh. The weight is then moved back and forth in a straight line across the surface of the sheet for a distance of eight or ten inches, twelve times in the machine direction and an equal number of times in the cross machine

[1] Chemist, Brooks Bank Note Company, Springfield, Mass.

direction. The point of intersection of the two paths which cross at right angles is then examined in the apparatus described below, after blowing off any loose lint or fuzz. Any fibers that have been raised by the friction of the weight will stand out with prominence, and the sample can be compared with a set of standards which have been similarly prepared from stock of which the press operating characteristics are known.

If it is desired to place the test on a numerical basis it will be necessary to count the fibers in a unit area. When this is to be done the apparatus should be adjusted so that only the fuzz will be illuminated.

Unless the test is carried out under conditions of controlled humidity, standards will have to be prepared each time the test is made if a high degree of accuracy is desired. However, little variation has been observed in carrying out the test under ordinary room conditions over a period of several months.

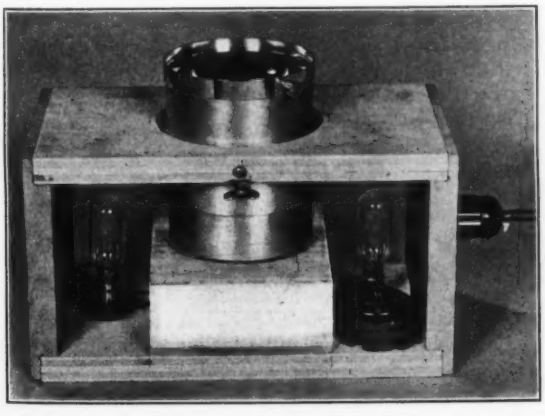
The above test has also been found to be suitable for paper, but in most cases a greater amount of friction has been necessary, either through the use of a heavier weight, or more rubbing.

The Fuzz Detector

In designing this apparatus, Fig. 1, it was found that a light source of high intensity and concentration was desirable, that the rays should be parallel to the paper surface, and that with a cylindrical light-shield, adjustable for height above the paper surface, it was possible to obtain a far greater range of lighting effects and uniformity of illumination than with any other type. It was also found that the addition of a low power magnifying lens of large diameter was of value.

The apparatus consists essentially of an adjustable cylindrical light-shield with a magnifying lens at the top, two incandescent lamps of high intensity, and a block for supporting the sample below the light-shield and at proper height with reference to the lamps.

The shield is made of a piece of heavy brass tubing 4¾ inches long by 4 inches in outside diameter. The lower end is ground flat and smooth, and to the top is fitted a standard Bausch and Lomb 4 inch reading glass. The tube slides within a close fitting collar and is held in place by friction. The collar is also provided with a set screw for locking the tube in place. The lamps are G. E. 100 watt, 110 volt projection type with concentrated filament, and bayonet-candelabra base. They are mounted 6½ inches apart, while the block which supports the sample is centered between them. The block has a width of 5 inches, and for best results, care should be taken to have the height such that the top surface is in line with the center of the lamp-filaments.



In use, the normal separation of the shield and the surface of the sample is seldom over ⅛ inch. To illuminate only the fuzz the separation must be much less.

Improvements in this apparatus would be a vacuum stage in place of the block, for keeping samples flat when used for examining paper and also a rack and pinion for operating the light-shield.

New Jordan Design

The new Jones Jordan made by E. D. Jones & Sons Company, Pittsfield, Mass. is now in production in three sizes which have been known in the trade as Standard, Imperial and Majestic. A combination of improvements of many details of the new Jordan first of all produces a decidedly different and more rugged outward appearance, in which the popular trend of streamlining shows its effect. The Jordan plug is now mounted in a most practical and accurate manner in cylindrical guides and bearing housings producing and maintaining a perfect plug alignment. Bearing housing and shell design now permit the complete removal of the plug without the necessity of dismantling either of the bearings from the shaft. Correct thrust bearing construction and control mechanism eliminates all longitudinal motion and insures permanent plug setting. These features combined with other essential details and all built into heavy and rugged semi steel castings that go to make up the Jordan, produce an engine worth thoughtful consideration.

TAPPI Notes

The New England Section of the Technical Association of the Pulp and Paper Industry will hold a joint meeting with the Connecticut Valley Division of the Superintendents Association at the Roger Smith Hotel, Holyoke, Mass. on Saturday, December 10. The technical meeting will be held in the afternoon and a dinner-dance in the evening. The speakers will be Phil Ray of the Hercules Powder Company, Wilmington, Del. who will discuss the removal of rubber from rags by the flotation method, and John P. Hagenauer of the Elk Paper Manufacturing Company, Childs, Md. who will discuss paper machine conversion losses.

John F. Leete who has been with the National Sugar Refining Company, New York is now president of the Industrial Sugars Corporation, 120 Wall street, New York, N. Y.

Hydraulic Horizontal Grinder

Bulletin H-1, just issued by The Hill Clutch Machine & Foundry Company, 6400 Breakwater avenue, Cleveland, O., describes the new Hill hydraulic horizontal grinder added to the company's line. The machine is powerfully built for heavy duty service, accurate grinding and fine finish. The company states that the grinder is applicable to flat or irregular surfaces on production or special jobs, such as machine tool beds and tables, machine knives, etc.

Review Of The Paper Industry Literature

Abstracts Compiled By the Abstracts and Bibliography Committee of the Technical Association of the Pulp and Paper Industry, A. Papineau-Couture, John F. Ohlson, C. E. Peterson and Clarence J. West, Chairman.

Copies of United States Patents can be obtained from the United States Patent Office, Washington, D. C. for 10 cents each. Send currency, not stamps.

Machinery

The Paper Machine Head Box and Slice. M. O. Neilson. Pulp Paper Mag. Can. 39: 11-14, 211-213, 283-286, 340-343 (Jan.-April, 1938).—A discussion of various factors affecting their design and operation.—A.P.-C.

Supply of Dyestuffs, Alum, and Other Materials in Solution or Suspension, to Paper Pulp During Its Passage to Paper Making Machines. O. Rolls. Brit. pat. 475,972 (June 16, 1936).—An outflow nozzle is connected to its supply tank (set high enough for the head to be considered constant) by means of a flexible pipe; deliveries in the ratio of, e.g., 1:10:100 may be obtained by changing the nozzle, and finer adjustment by altering the outlet level. Scales graduated in output are beside the nozzle.—A.P.-C.

Paper Formation. Leonard R. Growdon assignor to K-C-M Co. Can. pat. 371,604 (Feb. 1, 1938).—Paper stock is flowed on a forming wire and water is withdrawn through the wire to effect the first stage of formation with the wire side surface zone deficient in the ultimate amount of mineral material desired. A suspension containing predetermined amounts of surface paper-making material is brought into contact with the formed web to be absorbed into and upon the wire-side surface zone. Then the sheet is subjected to suction on the side opposite that to which additional paper forming material was added. An apparatus is specified.—A.P.-C.

Disc Refiner Design and Application. D. Manson Sutherland, Jr. Paper Trade J. 106, no. 12: 41-44 (March 24, 1938).—Further data on the design and performance of disc refiners are given. Commercial operations of disc refiners are given and advantages of preprocessing or base refining are suggested.—A.P.-C.

Economic Factors of Refining. G. Lamont Bidwell, Jr. Paper Trade J. 106, no. 8:195-197 (Feb. 24, 1938).—A brief discussion of refining problems from a broad angle designed to emphasize their importance to the industry as a whole.—A.P.-C.

Paper Manufacture. Wilbert L. Campbell, assignor to Canadian Gypsum Co. Can. pat. 369,183 (Oct. 12, 1937).—White-water is recirculated by feeding a suspension of paperstock to the forming wire to form a web. The water passing through the wire is collected and immediately a filler such as calcium sulphate is added to the water prior to recirculation.—A.P.-C.

Method and Means for Keeping Paper Machine Piping Clean. V. J. B. Apparatebom Gesellschaft. Fr. pat. 822,003 (May 19, 1937).—The return reach of the paper machine is cleaned by spraying with white water. In order to prevent fiber and other solid material from settling out in the piping carrying the white water, the latter is given a gyratory motion in the piping from the collecting trays to the white water tank, and also from the white water tank to spray nozzles and in the spray nozzles themselves.—A.P.-C.

New Concepts of Paper Machine Tables. Karl Bachmann. Industrie Papetiere 16:27-35 (Feb., 1938).—A brief description of the most recent improvements incorporated into paper machine tables by Voith & Co.—A.P.-C.

Stock Level and Pressure-Recording, Indicating and Control. A. H. Stanton. Paper Trade J. 106, no. 12: 46-48 (March 24, 1938).—A review and comparison of available equipment for recording, indicating and controlling stock level and pressure, together with a discussion of the characteristics affecting design of equipment and an outline of typical control applications to provide operating economy and lower installation cost.—A.P.-C.

Pulp Thickener. H.L.G. Muller. Belg. pat. 422,491 (Aug. 8, 1937).—The pulp is fed into a cylindrical vat in which is mounted excentrically a rotating wire-covered cylinder mold, so that the space between the cylinder and the wall of the vat decreases in the direction of travel of the cylinder.—A.P.-C.

The Vortrap. Horace Freeman. Paper Trade J. 106, no. 11:43-46 (March 17, 1938).—The troubles caused by the presence of dirt in paper stock and the means and methods hitherto available for removing the dirt, are briefly summarized. The need for, and the development of, the "vortrap," applicable to all grades of stock are recounted. The construction and operation of the machine and the results obtained are detailed. Typical installations are illustrated by photographs.—A.P.-C.

Cowles Classifiners and Waste Paper Systems. Edwin C. Cowles. Paper Trade J. 106, no. 8: 198-202 (Feb. 24, 1938).—Their performance and merits are discussed.—A.P.-C.

A Scraping Roll Arranged Oblique to the Direction of Motion of a Sheet of Paper with Elastic Longitudinal Strips Arranged on the Surface of the Roll. Schmidt & Brosel, Halle. Ger. pat. 646,439 (Nov. 8, 1835).—The scraping roll is to be used in the manufacture of parchment paper, to remove the acid slime from the sheet as it emerges from the acid tub.—J.F.O.

Arrangement for Actuating Regulating Devices for Wire and Felt Guides or Consistency Regulators for a Paper Machine. Firma J. M. Voith, Heidenheim, Brenz. Ger. pat. 646,672 (June 14, 1935).—The invention concerns itself with a device which operates in relation to the varying pressure of a pressure medium supplied with a more or less closed opening.—J.F.O.

Knotter for Paper and Similar Fiberous Materials. Reinicke & Jasper G.m.b.H., Kothen. Ger. pat. 648,032 (Aug. 9, 1935).—J.F.O.

Ohio TAPPI Discuss Selection of Men

The Ohio section of the Technical Association of the Pulp and Paper Industry held a dinner meeting at the Hotel Manchester, Middletown, Ohio, Saturday evening, November 26. About 50 men atttended the meeting. Many members of the Miami Valley Division of the American Pulp and Paper Mill Superintendents, to whom a special invitation had been extended, were present. Homer H. Latimer, Champion Paper and Fibre Company, chairman of the Ohio Section, presided at the meeting. Following the dinner a short business session was held.

H. H. Harrison, Crystal Tissue Company, first vice chairman, of the National Superintendents Association and Walter E. Sooy, Gardner Richardson Company, chairman of the Miami Valley Division,, were called upon for a few words and expressed the spirit of cooperation between the two local organizations.

Prof. J. R. Van Tassel Speaks

The group was then privileged to hear Professor R. J. Van Tassel of the Psychology Department of Miami University, Oxford, Ohio. Professor Van Tassel discussed "Psychological Factors in the Selection of Men."

In his introductory remarks three common faults were cited as possible courses for some of our current industrial problems. The inability of sellers to accept the view of buyers and to realize that their interests are one, the feeling that governmental interest is apart from individual interest, and the inability to correlate the interest of employee and employer.

This last point, the correlation of the interests of employer and employee was the basis for Professor Van Tassel's address. Three phases were discussed: matching men and jobs, training men on the job, and following up this training to determine how successful the selection and training had been.

For matching men and jobs, the interview was cited as the general method used. Evidence presented indicated that the importance of interviews might be affected by prejudice of interviewers, likes and dislikes gained in first impressions and conditions unrelated to the interview. More valuable information is obtained when several men interview the applicant using a standard procedure which includes questions of significance and a definite rating scheme.

Psychological tests with the nature of the test based on a thorough job analysis can be used to great advantage. As an illustration, a clerical worker should be rated on intelligence tests involving standardized spelling, grammar and punctuation tests, whereas a laborer should be chosen on his ability to interpret instructions.

The importance of the proper selection of men is borne out in the range of abilities recognized on identical jobs. In general, the most efficient are three to four times better than the least efficient. Professor Van Tassel pointed out that tryouts are necessary but are probably even more costly than generally assumed. To the expense involved in normal training must be added the fact that accident rates among new workers are greatest and also, the wastage and breakage costs are higher.

The general use of application blanks as a method of selection can be made more valuable if items listed are later checked against success of the selection of the man for the job.

Professor Van Tassel's second point, the training of men on the job, again stressed the necessity for studying the job itself. The utilization of experience of older employees and the elimination of unnecessary movements must be taught rather than learned.

A follow-up procedure regarding the success of the selection is the final step. Too much responsibility should not be placed on the foreman unless he himself is well trained. A well-trained foreman must be capable of interpreting management policies in addition to training and directing the men on the job.

In reply to questions following the formal talk, Professor Van Tassel said that many colleges attempt to guide students in selection of work through interest tests and counsel with psychological advisors. Home training of an applicant should be considered when the nature of work warrants but should be tempered with reason. Letters of reference are valuable only when the man or organization signing the reference are known to be competent judges. To a question concerning the advisability of one man selecting men for an entire plant, Professor Van Tassel stated that information concerning jobs obtained from advice from foremen was absolutely necessary in the proper selection of men for particular jobs.

Those in Attendance

Those present were as follows:

W. E. Sooy, S. V. Rogers, Warren C. Rupp, C. R. Boggs, Harry E. Hadley, John Ditmyer, H. F. Bennett, R. W. Richardson, James Combie and Jack Smith Jr., of Gardner-Richardson Company, Middletown, Ohio.

Harry C. Fisher, Thage Dalgren, Richard Holmes, and C. C. Walters of Gardner-Richardson Company, Lockland Division.

Wm. Beckett, Ed Lumm, John Burnett, Harold C. Leighton and Wm. Reigers of Beckett Paper Company, Hamilton, Ohio.

W. Macklem, J. C. Scholler, Rudolph Kutter, T. H. Latimer, Henry Leyer, Fred Augustin Sr., Charles Leyer, Carl W. Jacobs, and Charles Satman of Black-Clawson Company, Hamilton, Ohio.

D. L. Stark, R. H. Beachler, T. Agronin and Peter J. Jerardi of Shartle Brothers Machine Company, Middletown, Ohio.

E. H. Bindley and Myron Wittmer of Cheney Pulp and Paper Company, Franklin, Ohio.

H. H. Harrison and J. E. Burdsall of Crystal Tissue Company, Middletown, Ohio.

R. H. G. Smith, R. B. Roe and G. H. Suhs of Sorg Paper Company, Middletown, Ohio.

A. S. Anderson, S. R. Olsen, George C. Munro, T. M. Chemerys, R. L. Belts and H. H. Latimer of Champion Paper and Fibre Company, Hamilton, Ohio.

Glen Marcum, Radcliffe Drug Company, Hamilton, Ohio.

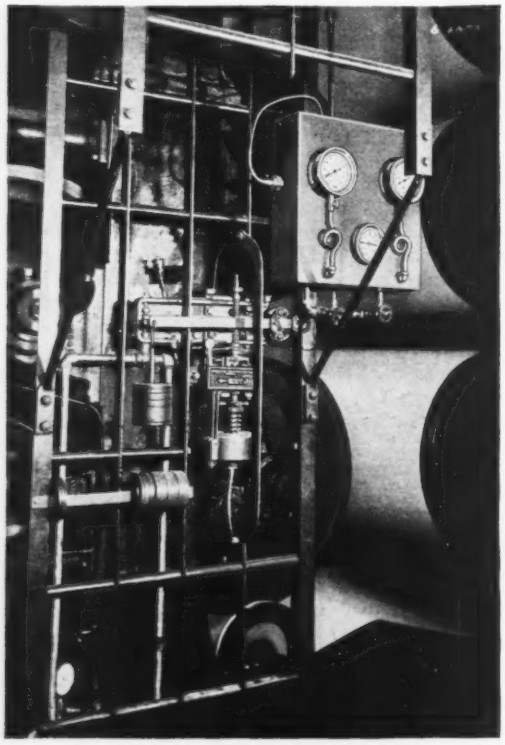
P. E. Howard, Bevis Machine Company, Middletown, Ohio.

Henry Waffenschmidt, National Aniline and Chemical Company.

New Stickle Thermal Control

Back of the new Stickle automatic tension and thermal control is the result of over a quarter of a century of close study in the art of paper drying. The Stickle tension and thermal control has been developed to give the paper manufacturer a control that has the combination of both tension and temperature control by combining two basic principles in control mechanism, without resorting to delicate mechanism. The basic principles of regulating steam valves by the tension of the paper has been found to be the most reliable and accurate method yet devised for controlling the drying of paper under normal operating conditions, but due to changes in weight or the variation in hydration of the paper stock the tension roll has a tendency to over regulate. This is due to the tension roll being very sensitive to every slight change that occurs in the physical characteristics of the paper or changes in the draws of the paper machine proper, resulting in a hunting action on the steam valves. This quick action on the steam valves may cause a variation in the speed of the machine or its auxiliaries which in turn causes a variation in the weight of paper passing over the driers and naturally this affects the tension roll and starts a cycle on one piece of apparatus causing another to function improperly.

By using the new Stickle thermal attachment connected direct to the control proper the hill and valleys are removed from the flow-meter chart and a closer regulation is obtained in the drying of the paper. The exacting specifications required at the present time on all grades of paper naturally leads to but one solution, modern paper specifications require modern equipment to hold the moisture and finish constant and smooth out the variables that are the result of improper drying.



NEW TENSION AND THERMAL CONTROL

Results obtained with the new Stickle automatic tension and thermal controls are as follows: Control of the moisture in the sheet within the closest possible limit stabilizing the steam flow to the paper machine resulting in a more uniform sheet of paper. Elimination of a larger amount of manual control which is so often necessary on other types of control equipment; a saving in steam due to checking the overheating of the driers and a better dried sheet of paper which naturally reflects itself in a higher quality product.

The illustration shows the application of the new Stickle automatic tension and thermal control on a Black-Clawson stack drier board machine making 97 tons chip in 24 hours.

Government Paper Bids

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., November 30, 1938 — The Government Printing Office has received the following bids for 23,025 pounds (75,000 sheets) of 50 per cent rag, 41 x 50 lithograph finish map paper; Graham Paper Company, 12.54 cents; Barton, Duer & Koch Paper Company, 10.22 cents; R. P. Andrews Paper Company, 12.54 cents; Stanford Paper Company, 10.38 cents; Mudge Paper Company, 10.44 cents; Paper Corp. of U. S., 10.98 cents; Walker, Goulard Plehn Company, 10.37 cents.

For 5,000 pounds (25 rolls) of 24 x 36 oiled manila tympan paper; Link Paper Company, 6.7 cents; Mudge Paper Company, 7.25 cents; Whitaker Paper Company, 7.85 cents; R. P. Andrews Paper Company, 6.5 cents; Barton, Duer & Koch Paper Company, 7.75 cents; Stanford Paper Company, 8.25 cents; Mathers-Lamm Paper Company, 7.05 cents; and Cromwell Paper Company, 7.73 cents.

For 40,000 pounds of No. 32, 32 inch rolls of yellow sulphite writing paper; Virginia Paper Company, 5.39 cents; Mudge Paper Company, 5.31 cents; Whitaker Paper Company, 5.23 cents; Paper Corp. of U. S., 5.4 cents; Mathers-Lamm Paper Company, 5.3 cents; R. P. Andrews Paper Company, 5.46 cents; Cauthorne Paper Company, 5.279 cents; and Marquette Paper Company, 5.31 cents.

For 30,000 pounds (150,000 sheets) of 19 x 24 moss green desk blotting paper; Andrews Paper House of York, 6.98 cents; A. Hartung & Co., 5.7 cents; Graham Paper Company, 5.1 cents; Virginia Paper Company, 4.78 cents; Mathers-Lamm Paper Company, 4.72 cents; Barton, Duer & Koch Paper Company, 4.69 cents; Mudge Paper Company, 4.725 cents; Whitaker Paper Company, 5.21 cents; L. Hyman & Son, 5.08 cents; Old Dominion Paper Company, 4.774 cents; Cauthorne Paper Company, 4.686 cents; and R. P. Andrews Paper Company, 5.03 cents.

For 100,000 sheets of 22 x 34 white gummed paper; Walker, Goulard Plehn Company, 4.99 per M sheets; Mudge Paper Company, $10.60; Mathers-Lamm Paper Company, $10.105; R. P. Andrews Paper Company, $9.99; Virginia Paper Company, $10.00; Andrews Paper House of York, $9.98; Old Dominion Paper Company, $9.877; Cauthorne Paper Company, $9.69; Enterprise Paper Company, $10.177; and Whitaker Paper Company, $10.40.

Imports of Paper and Paper Stock

Giving Manifests of New York, Boston, Philadelphia and Other Ports of Newsprint, Wrapping, Writing, Coated, Blotting, Tissue, Strawboard, Wallboard, Cigarette Papers, Sulphite, Kraft and Ground Wood Pulp.

NEW YORK IMPORTS

WEEK ENDING NOVEMBER 26, 1938

SUMMARY

Cigarette paper	415 cs.
Wall paper	14 cs.
Paper hangings	9 bls.
Newsprint	1,549 rolls
Printing paper	28 cs.
Drawing paper	2 cs.
Filter paper	4 cs.
Bristol boards	2 cs.
Metal covered paper	2 cs.
Surface baryta coated paper	107 crates
Surface coated paper	5 cs.
Decalcomania paper	23 drums
Decalcomanias	11 cs.
Transfer pictures	7 cs.
Transfer paper	22 cs.
Tissue paper	4 cs.
Veneer paper	2 cs.
Colored paper	2 cs.
Writing paper	63 cs.
Paper tubes	54 cs.
Miscellaneous paper	12 cs.

CIGARETTE PAPER

Champagne Paper Corp., *Normandie*, Havre, 415 cs.

WALL PAPER

——, *Europa*, Bremen, 14 cs.

PAPER HANGINGS

W. H. S. Lloyd & Co., *American Shipper*, London, 9 bls.

NEWSPRINT

Jay Madden Corp., *Koln*, Finland, 291 rolls.
Perkins Goodwin & Co., *Koln*, Hamburg, 507 rolls.
Parsons & Whittemore, Inc., *Heimvard*, Sundsvall, 79 rolls.
Jay Madden Corp., *Europa*, Finland, 45 rolls.
Perkins Goodwin & Co., *Deutschland*, Hamburg, 125 rolls.
Jay Madden Corp., *Deutschland*, Finland, 502 rolls.

PRINTING PAPER

S. H. Pomerance, *American Shipper*, London, 2 cs.
E. Dietzgen & Co., *Deutschland*, Hamburg, 26 cs.

DRAWING PAPER

H. Reeve Angel & Co., Inc., *American Shipper*, London, 2 cs.

FILTER PAPER

H. Reeve Angel & Co., Inc., *American Shipper*, London, 4 cs.

BRISTOL BOARDS

Keuffel & Esser Co., *American Shipper*, London, 2 cs.

METAL COVERED PAPER

——, *Europa*, Bremen, 2 cs.

SURFACE BARYTA COATED PAPER

Globe Shipping Co., *Deutschland*, Bremen, 107 crates.

SURFACE COATED PAPER

L. A. Consmiller, *Deutschland*, Bremen, 5 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., *Britannic*, Liverpool, 23 drums.

DECALCOMANIAS

Sellers Transportation Co., *Europa*, Bremen, 11 cs.

TRANSFER PICTURES

Rohner Gehrig & Co., *Europa*, Bremen, 7 cs.

TRANSFER PAPER

Dingelstedt & Co., *Deutschland*, Hamburg, 18 cs.
Phoenix Shipping Co., *Deutschland*, Hamburg, 4 cs.

TISSUE PAPER

F. C. Strype, *Britannic*, Liverpool, 1 cs.
Corn Exchange Bank Trust Co., *Kano Maru*, Kobe, 3 cs.

VENEER PAPER

Corn Exchange Bank Trust Co., *Kano Maru*, Kobe, 2 cs.

COLORED PAPER

D. C. Andrews & Co., *Europa*, Bremen, 2 cs.

WRITING PAPER

——, *Vulcania*, Trieste, 63 cs.

PAPER TUBES

——, *Deutschland*, Hamburg, 54 cs.

MISCELLANEOUS PAPER

Remington Rand, Inc., *Kano Maru*, Yokohama, 5 cs.
——, *Kano Maru*, Yokohama, 1 cs.
H. W. Robinson Co., *Normandie*, Havre, 5 cs.
——, *Europa*, Bremen, 1 cs.

RAGS, BAGGINGS, ETC.

Chase National Bank, *Cameronia*, Glasgow, 59 bls. bagging.
——, *Cameronia*, Glasgow, 73 bls. bagging, 42 bls. paper stock.
Hughes Fawcett, Inc., *Cameronia*, Glasgow, 129 bls. flax waste.
——, *American Shipper*, London, 63 bls. old twines, 68 bls. waste strings.
——, *Veendam*, Rotterdam, 9 bls. waste canvas cuttings.
Darmstadt Scott & Courtney, *Exhibitor*, Casablanca, 245 bls. rags.
——, *Exeter*, Alexandria, 80 bls. rags.
Manufacturers Trust Co., *Britannic*, Liverpool, 15 bls. rags.

HIDE GLUE

——, *Vulcania*, Trieste, 200 bags (ground).

OLD ROPE

National City Bank, *Cameronia*, Glasgow, 41 coils.
W. Steck & Co., *Veendam*, Rotterdam, 58 coils.
E. J. Keller Co., Inc., *Veendam*, ——, 49 coils.
Irving Trust Co., *Black Falcon*, Rotterdam, 57 bls.

CHINA CLAY

Orbis Products Corp., *Veendam*, Rotterdam, 392 bags.
Whitaker Clark & Daniels, Inc., *Veendam*, Rotterdam, 448 bags.

WOOD PULP

Castle & Overton, Inc., *Koln*, Hamburg, 3150 bls. wood pulp, 610 tons.
——, *Koln*, Bremen, 425 bls. wood pulp.
J. Manheimer, *Veendam*, Rotterdam, 30 bls. wood pulp.
A. Giese & Son, *Veendam*, Rotterdam, 40 bags wood pulp.
Bulkley Dunton Pulp Co., Inc., *Heimvard*, ——, 1500 bls. sulphite, 300 tons; 600 bls. sulphate, 100 tons.
——, *Heimvard*, Hernosand, 5910 bls. sulphate, 985 tons; 5150 bls. sulphite, 836 tons.
——, *Heimvard*, Obbola, 2450 bls. sulphate, 350 tons.
Cellulose Sales Co., Inc., *Heimvard*, Sundsvall, 675 bls. sulphite, 130 tons; 1350 bls. sulphate, 225 tons.
Mead Sales Co., Inc., *Heimvard*, Sundsvall, 500 bls. sulphite, 100 tons.
Absorbo Beer Pad Co., *Vulcania*, Trieste, 700 bls. wood pulp.
Gottesman & Co., Inc., *Belos*, Sweden, 6000 bls. wood pulp.

ALBANY IMPORTS

WEEK ENDING NOVEMBER 26, 1938

Halifax Power & Pulp Co., *Astrid*, Sheet Harbor, N. S., 11,219 bls. mechanically ground pulp.
Price & Pierce, Ltd., *Gonzenheim*, ——, 150 bls. unbleached mechanical pulp.

PORTLAND IMPORTS

WEEK ENDING NOVEMBER 26, 1938

Price & Pierce, Ltd., *Alssund,* ———, 1050 bls. unbleached sulphate; 600 bls. unbleached sulphite.

BOSTON IMPORTS

WEEK ENDING NOVEMBER 26, 1938

———, *Koln,* Bremen, 250 bls. wood pulp, 35 tons.
Jay Madden Corp., *Koln,* Bremen, 351 tons news print.
J. Anderson & Co., *Heimvard,* Soderhamn, 600 bls. sulphite, 120 tons.
Mead Sales Co., Inc., *Heimvard,* Soderhamn, 125 bls. sulphite, 25 tons.
———, *Heimvard,* Hernosand, 4500 bls. sulphite, 750 tons; 1350 bls. sulphate, 225 tons.
Perkins Goodwin & Co., *Heimvard,* Munksund, 2010 bls. sulphate, 335 tons.
Perkins Goodwin & Co., *Heimvard,* Obbola, 1715 bls. sulphate, 245 tons.
Bulkley Dunton Pulp Co., Inc., *Heimvard,* ———, 900 bls. sulphate, 150 tons.
Cellulose Sales Co., Inc., *Heimvard,* Sundsvall, 795 bls. sulphite, 152 tons; 300 bls. chemical pulp, 65 tons; 1632 bls. sulphate, 272 tons.
Atterbury Bros., Inc., *Heimvard,* Sundsvall, 600 bls. dry pulp, 100 tons.
Mead Sales Co., Inc., *Heimvard,* Sundsvall, 300 bls. sulphite, 50 tons.
Perkins Goodwin & Co., *Heimvard,* Sundsvall, 1098 bls. sulphate, 188 tons.
———, *Black Falcon,* Antwerp, 133 bls. rags, 59 bls, thread waste.
Irving Trust Co., *Black Falcon,* Antwerp, 57 bls. bagging.
E. Butterworth & Co., Inc., *Black Falcon,* Antwerp, 34 coils old rope.
Price & Pierce, Ltd., *Alssund,* ———, 600 bls. unbleached sulphite; 300 bls. unbleached sulphate.

PHILADELPHIA IMPORTS

WEEK ENDING NOVEMBER 26, 1938

Perkins Goodwin & Co., *Koln,* Hamburg, 283 rolls newsprint.
———, *Koln,* Bremen, 222 rolls, 34 bls. wrapping paper.
———, *Koln,* Bremen, 92 rolls newsprint.
Johaneson Wales & Sparre, Inc., *Koln,* Bremen, 1016 bls. chemical pulp.
Price & Pierce, Ltd., *Milos,* ———, 1200 bls. unbleached sulphite; 360 bls. unbleached sulphate.
Price & Pierce, Ltd., *Tunaholm,* ———, 120 bls. bleached sulphite.

BALTIMORE IMPORTS

WEEK ENDING NOVEMBER 26, 1938

M. Sone, *Heimvard,* Soderhamn, 1000 bls. mechanical pulp, 200 tons.
Bulkley Dunton Pulp Co., Inc., *Heimvard,* ———, 1165 bls. sulphite, 233 tons.
Cellulose Sales Co., Inc., *Heimvard,* Soderhamn, 500 bls. sulphate, 100 tons.
———, *Heimvard,* Hernosand, 300 bls. sulphate, 50 tons.
M. Sone, *Heimvard,* Sundsvall, 3000 bls. dry pulp, 500 tons.
Cellulose Sales Co., Inc., *Heimvard,* Sundsvall, 2400 bls. sulphate, 400 tons; 600 bls. chemical pulp, 130 tons.
Nolan Bowmall & Co., Inc., *Heimvard,* Sundsvall, 51 rolls newsprint.
Parsons & Whittemore, Inc., *Heimvard,* Sundsvall, 181 rolls newsprint.
Congoleum Nairn Co., *Exeter,* Marseilles, 6 bls. rags.
Price & Pierce, Ltd., *Tunaholm,* ———, 210 bls. bleached sulphite; 300 bls. unbleached sulphate.
Price & Pierce, Ltd., *Wanja,* ———, 4830 bls. unbleached sulphite; 840 bls. unbleached mechanical pulp.

NORFOLK IMPORTS

WEEK ENDING NOVEMBER 26, 1938

Price & Pierce, Ltd., *Wanja,* ———, 3000 bls. unbleached sulphite.

NEW ORLEANS IMPORTS

WEEK ENDING NOVEMBER 26, 1938

National Pulp & Paper Co., Inc., *Koln,* Bremen, 305 rolls newsprint.

All-Visible Bristol Sampler

To help the printer solve his bristol and index problems, M. M. Elish & Co., Inc., 29 Beekman street, have just delivered their new all-visible Bristol and Index Sampler to the trade. In this one piece handy unit is found 14 different bristol and index lines including 63 colors, in a wide variety of weights and finishes. These 14 grades offer to the printing and lithographic trades a complete assortment of printing, folding, and tough body stocks, halftone, line-plate and type grades, for letterpress and offset.

This new all-visible Bristol and Index Sampler makes it a simple matter to quickly find the color, thickness, finish and grade wanted.

The sampler is composed of a four section unit, each section containing two sample pads, the samples are stepped, all steps being printed with full data as to the stock, enabling the user to see at a glance the full range of colors, grades and finishes. The swatches are attached to the cover with staples for easy swiveling. Of further interest to the printer should be the fact that a number of the swatches shown in the Sampler were printed in one impression, the platen of the press having been built up to take this imprint in one impression.

An unusually striking method of dramatizing the presentation of this sampler has been employed by stringing through the eyelet binding one of the swatches to the cover, a large old-fashioned housekey, together with a printed legend "The Key to your Bristol & Index Problems."

A price list of all the grades shown in this sampler is also enclosed as well as a return post card inviting criticism and suggestions for improving M. M. Elish & Co., Inc., sampling program.

New Keith Plan Progresses

[FROM OUR REGULAR CORRESPONDENT]

TURNERS FALLS, November 28, 1938—Plans have moved forward for the re-financing of the Keith Paper company under a plan introduced in October to the stockholders and which contemplates the association of Paul E. Hodgdon, president and treasurer of the Deerfield Glassine company of Monroe Bridge, as general manager.

A substitute plan in which un-named New York interests offered to purchase more than 50 per cent of the common stock at $10 a share failed to interest enough stockholders to prevail.

The present plan which is now being worked out calls for a loan from the Reconstruction Finance corporation of $250,000, $50,000 each from the Merchants National Bank of Boston and the First National Bank and Trust company of Greenfield and $25,000 from the Turners Falls Power and Light company. A voting trust of the majority of the stock of the company will be created to comply with the requirements of the RFC.

The new cash will take care of existing debts, provide funds for necessary new equipment and sufficient working capital to manufacture again.

Mr. Hodgdon was formerly with the Brown Paper company and later with the Eastern Manufacturing company of Bangor, Me. He was general superintendent of both pulp and paper mills of the Munising Paper company and later became associated with the Deerfield Glassine company with which association he has been for the past eight years.

SUPER wants this . . .

A paper mill pump must be rugged enough to go in on the job it's designed for—and stay with it, round the clock, month after month. And it must be correctly designed to keep power consumption low.

MAINTENANCE MAN wants this

Give me a pump that's built throughout to give long service between repairs . . . with shafts heavy enough to prevent vibration and deflection . . . bearings large enough to keep replacements at a minimum . . . proper clearances between impeller and case rings to cut down wear . . . easy access to impeller and stuffing boxes to save time and trouble on maintenance.

WARREN PUMPS *provide both*

Warren pumps have extra-heavy shafts, oversize bearings, large stuffing boxes—all the details that keep *Warren Pumps on the job*, and pumping costs down to rock bottom *year after year*. And on stock-handling jobs, consider Warren's self-cleaning, non-binding impeller that keeps heavy stock on the move. Bring your pumping problems to Warren.

WARREN STEAM PUMP CO., INC., Warren, Mass.

West Virginia Pulp and Paper Company

230 Park Ave. New York
35 East Wacker Drive Chicago
Public Ledger Building Philadelphia, Pa.
503 Market St. San Francisco, Cal.

Manufacturers of

ENGLISH FINISH SUPERCALENDERED MACHINE FINISHED BOOK and LITHOGRAPHIC PAPERS

Offset, Envelope, Bond, Writing, Mimeograph, Ledger, Eggshell, Cover and Music Papers, Index Bristol, Post Card and Label Papers

HIGH GRADE COATED BOOK

• • • •

KRAFT WRAPPING AND KRAFT ENVELOPE
KRAFT CYLINDER BOARD
BLEACHED SULPHITE AND SODA PULP
BLEACHED AND UNBLEACHED KRAFT PULP

MILLS:
Mechanicsville, New York — Tyrone, Pennsylvania
Luke, Maryland — Williamsburg, Pennsylvania
Covington, Virginia — Cass, West Virginia
Charleston, South Carolina

COLORS

for

Board and *Paper*

Green
CHROMIUM OXIDES

Black Brown Red Yellow
IRON OXIDES

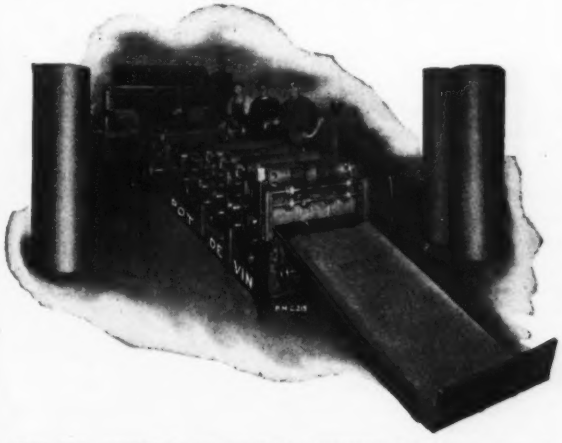
LAMP BLACK
TALC
UMBERS
VENETIAN REDS
YELLOW OCHRES

C. K. WILLIAMS & CO.
Easton, Pa.

POTDEVIN TUBERS

for every purpose—small coin wraps, bottle wraps, flour tubes, cement tubes, blanket bags, etc. from 1 to 6 walls.

POTDEVIN also builds bottomers, valvers, sewers, printing presses, compensators and full accessories covering the range of POTDEVIN tubers.



PMC 215. POTDEVIN MULTI-SIZE PRINTING TUBER for garment storage bags up to 80" long.

POTDEVIN MACHINE CO.
1223 38th Street Brooklyn, New York

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, November 30, 1938.

Improvement in the demand for many grades of paper continues to be reported in the wholesale market as general business continues to enter higher ground. The index of general business activity now stands at 93.1 per cent, compared with 90.1 per cent for the preceding week, and with 88.6 per cent for the corresponding week last year. Little change in the production of paper is indicated for the current week, but the trend continues upward. The production ratio of 186 paper mills for the week ended November 19 was 80.6 per cent, compared with 6.5 per cent for the week ended November 20, 1937. Paper board production stands at 67.0 per cent, compared with 56.0 per cent for the week ended November 20, 1937.

The gradual improvement in newsprint consumption continues and from the reports received from advertising circles a substantial increase in newspaper advertising lineage indicates the probability of larger newsprint consumption in the first quarter of next year and that 1939 will in all probability be a good year. Prices remain firm, with the probability that the dual-price situation of $48 to $50 per ton will continue throughout 1939.

Volume in the lower grades of sulphite bond papers continues good, with reports of a little better demand for the medium grades. Little change in the demand for rag papers is reported this week, but somewhat more activity in book papers for letterpress printing is viewed in the trade as encouraging.

Demand for Kraft papers continues good, with production quite well balanced with orders and shipments. Although price concessions in some grades continues, no change in representative quoted market prices has occurred this week and no downward revision is looked for.

Mechanical Pulp

No important change in demand or prices has been reported in mechanical pulp for this week. Although the price trend is quite generally viewed as downward, current prices are held to be low and further reductions are not expected in the trade.

Chemical Pulp

The price trend of chemical pulp is reported as downward with prices holding at current quotations. Consumption is gradually improving with the prevailing price of prime bleached sulphite, imported and domestic, at $50 per ton. Sales of small lots of some grades of Kraft pulp are reported at a little under prevailing prices, but in general, no important change in the price of any grade of pulp is reported this week.

Old Rope and Bagging

No important change in demand or prices is reported in old rope. Prices continue steady at prevailing quoted market levels. Old bagging business continues light and no important change in prevailing prices is reported.

Rags

The demand for the higher grades of new white rags is a little improved for the week. Prices are unchanged under a light demand, with blue overall lower and currently quoted at from 5.00 to 5.25 No. 1 and No. 2 roofing rags continue quite active but prices remain unchanged for this week. The foreign rag market is inactive and prices are nominal.

Old Waste Paper

No change in prevailing quotations has been reported on any grade of waste paper for this week. Demand continues light and the present price level is generally conceded to be very low, particularly on the lower grades, such as No. 1 mixed paper which is currently quoted at from .15 to .20 per cwt., f.o.b., New York.

Twine

A little improvement in demand is reported in some grades of twine. No change in prices is reported on any grade of hard or soft fiber twine for the current week.

Franklin Institute Honors N. A. Considine

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., November 28, 1938—Norbert A. Considine, president of the Paper House of Pennsylvania, and a former president of the Paper Trade Association of Philadelphia, has been appointed to membership on the Memorial and Museum Committee of The Franklin Institute, Philadelphia. Mr. Considine, well and favorably known as the Consul for Finland in Philadelphia, has been very active in the membership of Franklin Institute.

H. A. Bouffard in Hospital

Hector A. Bouffard, paper mill supplies agent in New York City, is at present in the Bellevue Hospital in New York recovering from an attack of pneumonia. Mr. Bouffard will probably be at Bellevue for the next few weeks.

Booth Chemical Co. Changes

At a special meeting held on November 19, 1938, the following were elected officers of the Booth Chemical Company, Elizabeth, N. J.: President, Mrs. L. M. Booth; vice president, Miss Louise E. McGrath; treasurer, H. L. Booth; secretary, Miss C. L. Lang.

THE DRAPER FELTS

All kinds and styles of Felts for all kinds and styles of Papers.

Write us about your Felt problems and let us help you reduce your Felt Costs—we will call anywhere at any time.

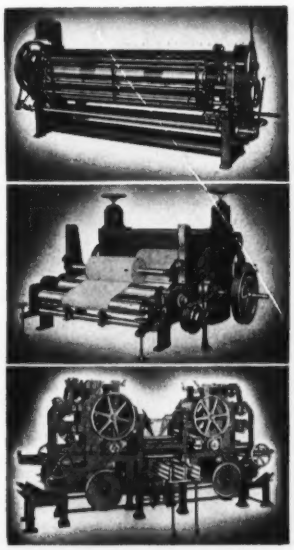
DRAPER BROS. COMPANY

CANTON, MASS.

Woolen manufacturers since 1856

A LINE OF MACHINES....
YOU CAN ALWAYS DEPEND ON

Here are illustrated only three of our complete line of paper converting machines that include winders, embossers, crepers, printing presses, and die inkers, folders for napkins, tissue, towel, wax paper, facial tissue, and special machines to meet plant requirements. Complete details of any machine in which you may be interested are yours upon request.



PAPER CONVERTING MACHINE CO.
GREEN BAY, WISCONSIN
Manufacturers of paper converting machinery for all purposes.

WOOD PULP AGENTS

PRICE & PIERCE, Ltd.,

60 EAST 42nd ST.
NEW YORK

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, November 30, 1938.

ALUM (ACTIVATED)—Quotations on activated alum continue firm and unchanged at prevailing market prices. The commercial grades are quoted at $.90 per 100 pounds, in 100 pound multi-wall bags, car lot quantities, f.o.b., works.

BLANC FIXE—The prices of blanc fixe are firm under an improved demand and continue unchanged at prevailing market levels. The pulp is offered at from $42.50 to $45 per ton, in bulk; the powder is quoted at from 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER—Quotations on bleaching powder continue firm and are unchanged at prevailing market prices. Bleaching powder is quoted at from $2 to $2.25 per 100 pounds, in drums, at works.

CASEIN—The demand for casein is reported as moderately good. Standard domestic ground casein, 20-30 mesh, is quoted at from 8½ to 9 cents per pound; 80-100 mesh, at from 9 to 9½ cents per pound; all prices in bags, car lot quantities.

CAUSTIC SODA—Quotations on caustic soda continue firm, with contracts being renewed at prevailing quotations. Solid caustic soda is quoted at from $2.10 to $2.30 per 100 pounds; flake and ground at from $2.50 to $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—The prices of china clay are firm and conform to prevailing market prices. Domestic filler clay is quoted at from $6.50 to $12 per ton; coating clay at from $11 to $22 per ton, at mines. Imported clay is quoted at from $14.50 to $25 per ton, ship side.

CHLORINE—Quotations on chlorine remain firm under an improved demand and contracts are being renewed at prevailing market levels. Chlorine is quoted at $2.15 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—The demand for rosin continues to be reported as fair. "G" gum rosin is quoted at $4.85; "FF" wood rosin at $4.80 per 280 pounds, gross weight, in barrels, at Savannah. Seventy per cent gum rosin size is quoted at $2.71 per 100 pounds, f.o.b., shipping point.

SALT CAKE—The demand for salt cake is reported as improved for the week. Prices are firm and unchanged, ranging from $12 to $13.50 per ton; chrome salt cake at from $11 to $12 per ton, f.o.b., shipping point. Imported salt cake is quoted at from $14.50 to $15 per ton, Gulf or Atlantic Seaboard, on dock.

SODA ASH—Quotations on soda ash are firm and contracts are being renewed at prevailing prices. Prices on soda ash in car lots, at works, per 100 pounds, are as follows: in bulk, $.90; in bags, $1.05; and in barrels, $1.35.

STARCH—The corn starch market reports prices as quite firm. Globe pearl is quoted at $2.50 per 100 pounds, in bags. Special paper starch is quoted at $2.60, in bags. All prices in car lots, f.o.b., Chicago.

SULPHATE OF ALUMINA—Prices on sulphate of alumina continue firm and unchanged at prevailing market quotations. The commercial grades are quoted at $1.15; iron free at $1.30 per 100 pounds, in barrels, car lot quantities, f.o.b., works.

SULPHUR—Quotations on sulphur continue firm under a good demand. Annual contracts are quoted at $16 per long ton, f.o.b., cars at mines. Spot and nearby car lots are offered at $19 per ton.

TALC—Quotations on talc are firm and conform to prevailing market levels. Domestic talc is quoted at from $15 to $18 per ton, Eastern mines. Imported talc is offered at from $25 to $40 per ton, on dock.

Market Quotations

Paper

(Delivered New York)

News, per ton—			
Roll, contract	$50.00	@	—
Sheets	58.00	@	—
Kraft—per cwt.—Delivered Zone A			
No. 1 Northern	$4.75	@	$5.25
Superstandard	4.12½	@	4.62½
Northern Standard Wrapping	4.00	@	—
Standard Wrapping	3.50	@	—
Tissues—Per Ream—Carlots			
White No. 1	.92½	@	—
White No. 1 M. G.	.90	@	—
White No. 1½	.67½	@	—
White No. 2	.60	@	—
Anti-Tarnish M. G.	.75	@	—
Colored	.87½	@	—
Kraft	.75	@	—
Manila	.60	@	—
Unbl. Toilet, 1 M.	3.20	@	—
Bleached Toilet	5.26	@	—
Paper Towels—			
Unbleached	1.80	@	—
Bleached	2.10	@	—
Manila—per cwt.—C. l. f. a.			
No. 1 Jute	8.25	@	9.75
No. 2 Jute	7.50	@	9.00
No. 1 Manila Wrapping, 35 lb.	5.00	@	—
No. 2 Manila Wrapping, 35 lb.	4.75	@	—
Boards, per ton—			
News	27.50	@	30.00
Chip	27.50	@	30.00
Sgl. Mla. Ll. Chip	42.50	@	—
Jute Lined Chip	42.50	@	45.00
White Pat. Coated	55.00	@	57.50
Kraft Liners	42.50	@	50.00
Binders Boards	71.00	@	77.00

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds	Ledgers
100% Rag Ext. No. 1	$39.10@$46.00	$40.25@$47.25
100% Rag	31.05@ 36.50	32.20@ 37.75
85% Rag	.....	29.90@ 35.00
75% Rag	23.60@ 27.75	24.75@ 29.00
65% Rag	.....	21.65@ 26.25
50% Rag	17.55@ 21.50	18.70@ 22.75
25% Rag	14.65@ 17.75	15.80@ 19.25

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds	Ledgers
No. 1	$8.20@$10.00	$9.35@$11.50
No. 2	7.30@ 9.00	8.50@ 10.25
No. 4	6.45@ 7.75	7.60@ 9.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper,

Delivered in Zone 1:

No. 1 Glossy Coated	$10.80	@	$12.50
No. 2 Glossy Coated	9.25	@	10.75
No. 3 Glossy Coated	8.15	@	9.50
No. 4 Glossy Coated	7.65	@	9.00
No. 1 Antique (watermarked)	7.65	@	9.00
No. 2 Offset	7.00	@	8.25
A Grade E. F.	6.80	@	8.00
A Grade S. & S. C.	7.05	@	8.25
B Grade E. F.	6.25	@	7.50
B Grade S. & S. C.	6.50	@	7.75
C Grade E. F.	6.00	@	7.00
C Grade S. & S. C.	6.25	@	7.25
D Grade E. F.	5.70	@	6.75
D Grade S. & S. C.	5.95	@	7.00

Ivory & India at $.50 cwt. extra.

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—			
Moist	25.00	@	28.00
Dry	25.00	@	28.00
(Delivered)			
No. 1 Domestic and Canadian	29.00	@	33.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Prime Bleached Sulphite	2.35	@	2.75
Prime Qualities—			
Easy-Bleaching Sulphite	1.90	@	2.10
Strong Unbleached Sulphite	1.80	@	2.00
(On Dock, Atlantic Ports)			
Kraft Bleached	2.25	@	2.75
Kraft Light & Strong	1.75	@	1.85
Kraft No. 1	1.55	@	1.75
Kraft No. 2	1.50	@	1.55
(F. o. b. Pulp Mill)			
Kraft Domestic	1.25	@	1.75
(Delivered)			
Soda Bleached	2.55	@	—

Add 60 cents per short ton, dock charges for Albany; $2.50 for Lake Ports East and $3.50 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1.	6.75	@	7.00
Silesias No. 1	4.00	@	4.25
New Unbleached	6.75	@	7.00
Blue Overall	5.00	@	5.25
Fancy	2.10	@	2.25
Washables	1.60	@	1.70
Mixed Khaki Cuttings	3.25	@	3.75
O. D. Khaki Cuttings	4.00		4.25

Old Rags

White, No. 1—			
Repacked	3.15	@	3.40
Miscellaneous	2.60	@	2.75
White, No. 2—			
Repacked	1.90	@	2.10
Miscellaneous	1.50	@	1.60
Thirds and Blues—			
Repacked	1.40	@	1.50
Miscellaneous	1.25	@	1.30
Roofing Rags—			
No. 1	1.15	@	1.20
No. 2	.90	@	1.00
No. 3 (bagging)	.85	@	.90
No. 4	.65	@	.70
No. 5A	.65	@	.70

Foreign Rags

New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	@	2.20
New Light Silesias	5.50	@	5.75
Light Flannelettes	5.50	@	5.75
New White Cuttings	7.00	@	7.50
New Light Oxford	4.00	@	4.50
New Light Prints	3.00	@	3.25

Old Rags

No. 1 White Linens	7.50	@	8.50
No. 2 White Linens	6.50	@	7.50
No. 3 White Linens	4.50	@	—

FINEST CLAYS

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No. 4 White Linens	2.25	@	3.25
No. 1 White Cotton	4.25	@	4.75
No. 2 White Cotton	3.25	@	3.75
No. 3 White Cotton	2.50	@	3.00
No. 4 White Cotton	1.90	@	2.20
Extra Light Prints	2.00	@	2.40
Ord. Light Prints	1.75	@	2.15
Med. Light Prints	1.55	@	1.95
Dutch Blue Cottons	2.25	@	2.50
French Blue Linens	3.00	@	—
Checks and Blues	2.00	@	—
Linsey Garments	1.90	@	2.00
Dark Cottons	1.50	@	1.60
Old Shopperies	1.30	@	1.45
New Shopperies	1.45	@	1.50
French Blues	2.25	@	2.50

Old Rope and Bagging

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	2.40	@	2.50
Domestic	2.25	@	2.35
Wool Tares, light	1.80	@	1.90
Wool Tares, heavy	1.90	@	2.00
Bright Bagging	1.70	@	1.80
Manila Rope—			
Foreign	2.60	@	2.75
Domestic	2.50	@	2.75
Jute Threads	2.75	@	3.00
Sisal Strings	1.50	@	1.60
Mixed Strings	.60	@	.70

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	2.50	@	2.60
Ordinary Hard White No. 1	1.90	@	2.00
Soft White No. 1	1.75	@	1.80
Soft White Extra	2.25	@	2.40
Flat Stock—			
Stitchless	.80	@	.85
Overissue Mag	.70	@	.75
Solid Flat Book	.60	@	.65
Crumbled No. 1	.40	@	.45
Ledger Stock White	1.15	@	1.25
Ledger Stock Colored	.65	@	.70
New B. B. Chips	.15	@	.20
Manila—			
New Env. Cut	1.40	@	1.50
New Cuttings	1.25	@	1.35
Old Kraft Machine— Compressed bales	.65	@	.75
News—			
No. 1 White News	1.35	@	1.40
Strictly Overissue	.50	@	.55
Strictly Folded	.30	@	.35
No. 1 Mixed Paper	.15	@	.20

Twines

(F. o. b. Mill)
(Soft Fiber)

Coarse Polished—			
India	.11	@	.13
White Hemp	.12	@	.14
Fine Polished—			
Fine India	.15	@	.17
Unpolished—			
Box	.08½	@	—
Paper Makers	.07½	@	.08½
Tube Rope	.09	@	.10
Wall Paper	.10	@	.11
Wrapping	.11	@	.13
Soft Fiber Rope	.09½	@	.11½
Cotton	.17	@	.22
(Hard Fiber)			
Medium Java	.10	@	.16
Mex. Sisal	.09	@	.15
Manila	.18	@	.25
Domestic	2.65	@	2.75
Sisal Rope	1.65	@	1.85
Mixed Rope	.50	@	.75
Transmission Rope	1.90	@	2.00
Soft Jute Ropes	1.65	@	1.75
Jute Carpet Threads	.75	@	.90
Gunny Bagging—			
Foreign	2.00	@	—
Domestic	1.90	@	2.00
Bleachery Burlap	3.25	@	3.50
Scrap Burlap—			
Foreign	1.60	@	—
Domestic	1.40	@	1.55
Scrap Sisal	1.25	@	1.50
Scrap Sisal for Shredding	1.75	@	1.90
Wool Tares, Heavy	1.55	@	1.65
New Burlap Cuttings	2.00	@	2.25
Aust. Wool Pouches	2.75	@	3.25
Heavy baling bagging	1.75	@	1.85
Paper Mill Bagging	1.00	@	1.15
No. 2 Bagging	.55	@	.75

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.03¼	@	.03½
New White No. 1	.06¾	@	.07
New Light Flannelettes	.04¼	@	.04¾
Silesias No. 1	.04¼	@	.04½
New Black Silesias	.03¾	@	.04
Silesias No. 1			
Soft Unbleached	6.50	@	7.00
Blue Cheviots	.05	@	.05¼
Fancy	.03	@	.03¼
Washable	.02¾	@	.03
Cottons—According to grades—			
Blue Overalls	.04¼	@	.05
New Black, soft	.03¼	@	.04
Khaki Cuttings	.03¼	@	.03¾
O. D. Khaki	.04	@	.04½
Corduroy	.02¾	@	.03
New Canvas	.06¾	@	.07¼
B.V.D. Cuttings	—	@	.06½

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	—	@	2.75
Miscellaneous	2.50	@	2.75
White No. 2—			
Repacked	1.90	@	2.00
Miscellaneous	2.00	@	2.25
Twos and Blues	1.75	@	2.00
Old Blue Overalls	1.50	@	—
Thirds and Blues—			
Repacked	1.37½	@	1.75
Miscellaneous	1.25	@	1.62½
Black Stockings	3.90	@	4.00
Roofing Stock—			
No. 1	1.00	@	1.10
No. 2	.75	@	.85
No. 3	.65	@	.70

Foreign Rags

(F. o. b. Boston)

Dark Cottons	1.05	@	1.15
Dutch Blues	2.65	@	2.75
New Checks and Blues	2.85	@	3.00
Old Fustians	2.25	@	2.50
Old Linsey Garments	2.20	@	2.25
New Silesias	4.75	@	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1	.06	@	.06¼
New White, No. 2	.03½	@	.04
Light Silesias	.03½	@	.04
Silesias, No. 1	—	@	.04½
Black Silesias, soft	—	@	.03
New Unbleached	.05½	@	.06
Washable, No. 1	.01½	@	.01¾
Blue Overall	.04	@	.04½
Cottons—Acording to grades—			
Washable No. 2	.01	@	.01¼
New Blue	.01	@	.01¼
Fancy Percales	—	@	.02½
New Black Soft	.03	@	.03½
New Light Seconds	—	@	.04½
New Dark Seconds	.50	@	.75
Khaki Cuttings—			
No. 1 O. D.	.03	@	.03½
No. 2 Mixed	.02	@	.02½
Corduroy	—	@	.02
New Canvas	.05	@	.05½
New Black Mixed	.02½	@	.02¾

Domestic Rags (Old)

White No. 1—			
Repacked	3.00	@	3.25
Miscellaneous	2.50	@	2.75
Thirds and Blues—			
Miscellaneous	1.00	@	1.25
Repacked	1.50	@	1.75
Black Stockings (Export)	3.00	@	3.50
Roofing Stock—			
Foreign No. 1	—	@	.95
Domestic No. 1	—	@	.95
Domestic No. 2	—	@	.85
Roofing Bagging	—	@	.60

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	1.75	@	2.00
Domestic	1.50	@	1.75
Manila Rope	—	@	3.50
Sisal Rope	1.50	@	1.75
Mixed Rope	.75	@	1.00
Scrap—			
No. 1	—	@	1.75
No. 2	1.00	@	1.25
Wool Tares, heavy	3.25	@	3.50
Mixed Strings	.75	@	1.00
No. 1 New Light Burlap	2.50	@	3.00
New Burlap Cuttings	1.75	@	2.00

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	2.25	@	2.30
No. 2 Hard White	1.90	@	2.00
No. 1 Soft White	1.75	@	1.80
No. 2 Soft White	1.30	@	1.40
No. 1 Mixed	.65	@	.75
Solid Ledger Stock	1.45	@	1.50
Ledger Stock, white	1.15	@	1.20
Ledger Stock, colored	.75	@	.80
No. 1 Books, heavy	.60	@	.75
Manila Cuttings	1.45	@	1.50
Print Manila	.40	@	.45
Container Manila	.35	@	.40
Kraft Paper	.75	@	.80
No. 1 Mixed Paper	.20	@	.25
Straw Board Chip	.25	@	.30
Binders Board Chip	.25	@	.30
Corrugated Board	.50	@	.55
Overissue News	.40	@	.45
Old Newspapers	.35	@	.40

BOSTON

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White	2.25	@	2.50
No. 1 Soft White	1.85	@	2.15
No. 2 Mixed	.75	@	.80
Solid Ledger Books	1.30	@	—
Overissue Ledger Stock	1.30	@	1.50
Mixed Ledgers	.85	@	.90
No. 1 Books, heavy	.65	@	.75
No. 1 Books, light	.65	@	.75
Crumpled Stitchless Book Stock	.55	@	.65
Manila Env. Cuttings	1.85	@	2.00
Manila Envelope Cuttings, extra quality	2.00	@	2.10
No. 1 Old Manila	.80	@	.90
White Blank News	1.30	@	1.40
No. 1 Kraft	.90	@	—
Mixed Papers	.15	@	—
Print Manila	.45	@	.55
Container Manilas	.27½	@	—
Old Newspapers	.25	@	.32½
Paper Wool Strings	.65	@	.75
Overissue News	.45	@	.50
Box Board Chips	.20	@	.25
Corrugated Boxes	.30	@	.32½
Kraft corrugated boxes	.70	@	—
Screening Wrappers	.40	@	.45

Bagging

(F. o. b. Boston)

Manila Rope—			
Foreign	2.65	@	2.75

CHICAGO

Old Papers

(F. o. b. Chicago)

Shavings—			
No. 1 White Envelope Cuttings	1.80	@	1.90
No. 1 Hard White	1.70	@	1.80
No. 1 Soft White	1.50	@	—
Ledger & Writings	.75	@	.80
Solid Books	.45	@	.50
Blanks	.90	@	—
Krafts	.45	@	.50
New Kraft Cuts	1.10	@	—
Manila Env. Cuts	Nominal		
Ex. No. 1 Manila	Nominal		
Print Manila	Nominal		
Overissue News	.35	@	—
Old Newspapers—			
No. 1 Folded News	.25	@	.30
No. 1 Mixed Paper	.15	@	.30
Roofing Stocks—			
No. 1	1.00	@	1.05
No. 2	.85	@	—

TORONTO

Paper

Bonds and Ledgers

Delivered

No. 1 White	.36½	@	—
No. 1 Tints	.37½	@	—
No. 2 White	.26½	@	—
No. 2 Tints	.27½	@	—
No. 4 White	15.50	@	16.50
No. 4 Tints	16.50	@	—
No. 5 Bond—White	11.25	@	—
No. 5 Bond—Tints	12.25	@	—
No. 5 Bond—Golden Rod	12.75	@	—
No. 5 Ledger—White	11.25	@	—
No. 5 Ledger—Tints	11.25	@	—
No. 6 Bond—White	10.15	@	—
No. 6 Bond—Tints	10.65	@	—
No. 6 Bond—Golden Rod	12.15	@	—
No. 7 Bond—White	8.50	@	—
No. 7 Bond—Tints	9.00	@	—
No. 7 Bond—Golden Rod	10.50	@	—
Book—			
No. 1 M. F.	7.35	@	—
No. 2 M. F.	6.85	@	—
No. 3 M. F.	5.60	@	—
No. 1 S. C.	7.60	@	—
No. 2 S. C.	7.10	@	—
No. 3 S. C.	6.10	@	6.35
No. 1 Coated Book and Litho	12.50	@	—
No. 2 Coated Book and Litho	11.00	@	—
No. 3 Coated Book and Litho	10.00	@	—
Coated tinted	13.50	@	—
Wrapping—delivered—			
Rag Brown	4.85	@	5.25
White Wrap	4.00	@	—
"B" Manila	4.90	@	6.15
No. 1 Manila	5.50	@	6.90
Fiber	5.50	@	6.90
Kraft No. 2	5.50	@	6.90

(F. o. b. Cars, Toronto)

News per ton—			
Rolls (contract)	46.00	@	—
Sheets	54.00	@	—

Pulp

Ground wood	29.00	@	—
Unbleached Sulphite	49.00	@	—
Kraft	50.00	@	—
Soda	54.00	@	—

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	2.25	@	—
Soft White	2.15	@	—
White Blk. News	1.25	@	—
Book and Ledger—			
Flat Magazine and Book Stock (old)	.80	@	—
Light and Crumpled Book Stock	.70	@	—
Ledgers and Writings	1.10	@	—
Manilas—			
New Manila Cut	1.35	@	—
Printed Manilas	.45	@	—
Kraft	.95	@	—
News and Scrap—			
Strictly Overissue	.50	@	—
Strictly Folded	.45	@	—
No. 1 Mixed Paper	.30	@	—

Domestic Rags

(Price to Mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.06½	@	.06¾
Fancy Shirt Cuttings	.02¼	@	.02½